

2009 ALPINE SATELLITE DEVELOPMENT PLAN (ASDP) WATER QUALITY MONITORING REPORT



Submitted to


ConocoPhillips
Alaska

Submitted by

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ACRONYMS AND ABBREVIATIONS

ADEC	Alaska Department of Environmental Conservation
ASDP	Alpine Satellite Development Plan
CD	Colville Delta
CPAI	ConocoPhillips Alaska, Inc.
CRD	Colville River Delta
DO	Dissolved Oxygen
DRO	Diesel Range Organics
EPA	U.S. Environmental Protection Agency
FID	Flame Ionization Detector
GC	Gas Chromatography
GPS	Global Positioning System
GRO	Gasoline Range Organics
ICP-MS	Inductively Coupled Plasma-Mass Spectrometry
MS	Mass Spectrometer
NAD83	North American Datum of 1983
NTU	Nephelometric Turbidity Units
PAH	Polynuclear Aromatic Hydrocarbons
RCRA	Resource Conservation and Recovery Act
RRO	Residual Range Organics
SIM	Selective Ion Monitoring
SGS	SGS North America, Inc.
TPH	Total Petroleum Hydrocarbons
TSS	Total Suspended Solids
USACE	United States Army Corps of Engineers
USGS	United States Geological Survey
VOC	Volatile Organic Compound

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1.0 INTRODUCTION

ConocoPhillips Alaska, Inc. (CPAI) initiated construction of the Alpine Facility (CD1 and CD2) in the Colville River Delta during the winter of 1998/1999. Alpine operations expanded during the 2004/2005 winter season with implementation of the Alpine Satellite Development Plan (ASDP). Construction included placement of gravel facilities for two new satellite drill sites: CD3 and CD4. The CD3 pad development included an airstrip and pad/airstrip access road, apron, and taxiway. The CD4 pad development included an access road running parallel to the existing Alpine Sales Pipeline, connecting to the CD2 access road.

In 2007 and 2008, three lakes near CD3 and CD4 facilities were monitored to comply with North Slope Borough Ordinance Serial No. 75-6-56, Stipulation III.2.4.3(f). The three sampling lakes were: M9313 near CD3, and L9323 and L9324 located north and south of CD4, respectively. Monitoring in 2009 supplemented the 2007 and 2008 results, providing the third continuous year of annual water quality data. The laboratory analyses were chosen to identify and monitor persistence of trace concentrations that were originally observed in 2007.

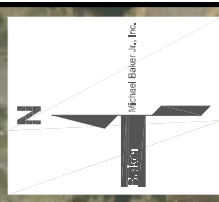
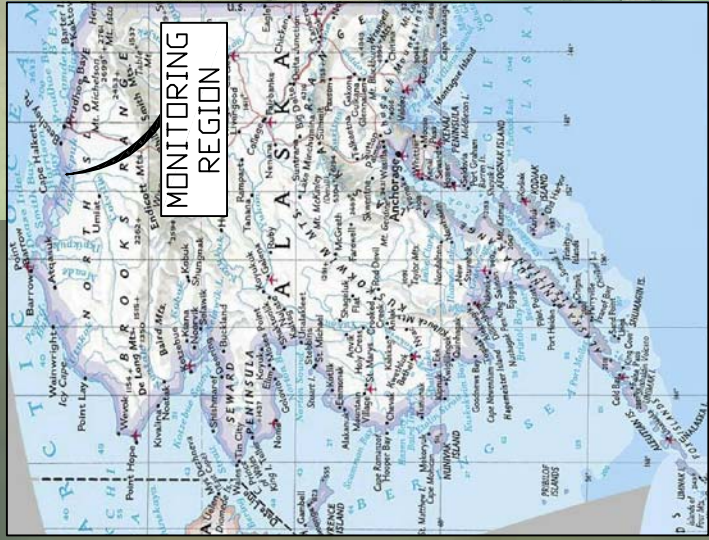
In 2009, the lake water quality monitoring program was expanded to include the proposed ASDP CD5 pad and access road. The date of construction and precise location of these facilities is unknown at this time. The pad will be accessed via a gravel road connected to the CD4 access road. No lakes are present at the proposed CD5 pad location. Lakes L9341 and M0353 are located adjacent to the proposed road alignment. Water quality data gathered during the 2009 study provides baseline data for future water quality analyses of these lakes. An overview of the five study lakes relative to Alpine facilities is presented in Figure 1.1.

The water quality monitoring program for all lakes included in situ field sampling of temperature, dissolved oxygen (DO), salinity, conductivity/specific conductance and turbidity. Additional water samples were collected for laboratory analysis of dissolved hydrocarbons--diesel range organics (DRO)/residual range organics (RRO) -- and Resource Conservation and Recovery Act (RCRA) 8 metals.

Additional analyses were conducted for Lakes L9341 and M0353 to obtain a comprehensive suite of baseline data for this initial sampling event. These additional analyses included gasoline range organics (GRO), volatile organic compounds (VOC), total petroleum hydrocarbons (TPH), and polynuclear aromatic hydrocarbons (PAH).

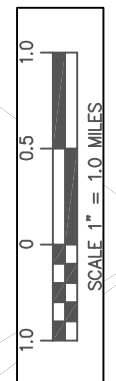
This report presents the field investigation procedures, sampling, and analytical methods used as well as the resulting water quality data and analyses. Field sampling was performed on August 4 and 5, 2009. Laboratory analyses identified targeted constituent concentrations well below state and national recommended water quality criteria and standards. Table 1.1 summarizes the field and laboratory sampling parameters for the five lakes included in the 2009 program.

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LEGEND

- ALPINE PIPELINES
- SAMPLE LAKE



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TABLE 1.1: FIELD AND LABORATORY SAMPLING PARAMETERS

Lake Designation	Field Sampling Parameters	Laboratory Analyses
M9313 L9323 L9324	Temperature Dissolved Oxygen Salinity Conductivity/Specific Turbidity	Diesel Range Organics (DRO) Residual Range Organics (RRO) Resource Conservation and Recovery Act 8 Metals (RCRA 8 Metals)
L9341 M0353	Temperature Dissolved Oxygen Salinity Conductivity/Specific Turbidity	DRO RRO RCRA 8 Metals Gasoline Range Organics (GRO) Volatile Organic Carbons (VOC) Total Petroleum Hydrocarbons (TPH) Polynuclear Aromatic Hydrocarbons (PAH)



PHOTO 1.1: SETTING OUT ON LAKE M9313. AUGUST 5, 2009.

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2.0 METHODS

Field investigations were conducted on August 4, 2009, at Lakes M0353, L9341, L9323, and L9324; and on August 5, 2009, at Lake M9313. Air Logistics Helicopters provided access to the five lakes. Each sampling location was identified and confirmed using a hand-held global positioning system (GPS) unit referenced to the North American Datum of 1983 (NAD83). Pre-defined locations were used for Lakes L9323, L9324, and M9313. At Lakes M0353 and L9341, the sampling locations were determined based on field evaluation with preference given to the deepest part of each lake as identified using a hand-held sonar depth finder.

In situ water quality data measurements and analytical sample collection were performed by a two-person team, each in an inflatable kayak, with an attached support raft for transporting the sampling equipment. In situ water quality instruments were provided by TTT Environmental. Analytical sample bottles and storage coolers were provided by SGS North America, Inc. (SGS). Field surveys were also conducted to identify possible inflow and outflow sources, and to determine if each lake was hydraulically connected to nearby waterbodies.

All safety precautions, as outlined in the North Slope Water Resources 2009 Health, Safety and Environmental Safety Plan (Baker 2009), were followed. Air Logistics Helicopters communicated travel plans to Alpine Security. Personnel were equipped with personal flotation devices (float-coats). Measures were taken to avoid animal interaction during all field activities.

Field sampling methods were based on USGS (2006), Ward and Harr (1990), and U.S. Army Corps of Engineers (USACE 1987) methods. It was assumed each lake was hydraulically isolated with no overland inflow or outflow. This was confirmed at each lake with an aerial survey of the perimeter of the lake. It was also assumed each lake was well-mixed and lacking significant stratification. Well-mixed conditions were confirmed with in situ measurements prior to analytic sample collection. Sample collection, storage, and transport for laboratory analysis methods were supplemented with instructions provided by SGS.

2.1 SAMPLE LOCATION SELECTION

The major assumption of this water quality study is that data collected at specific stations are representative of conditions throughout the water body. Thus, water samples collected at a single location are representative of the water body. Past in situ monitoring of North Slope lakes indicates that hydraulically isolated lakes are well-mixed during open water conditions. The likelihood of homogeneous conditions, which can be verified with in situ measurements, supports the use of single point sampling.

Lake bathymetry was initially used to select a single sampling location for Lake M9313 (Figure 2.1) and Lakes L9323 and L9324 (Figure 2.2). Site selection was based on maximum lake depth and relative proximity to gravel facilities. Specific locations were confirmed with field depth soundings.

The sampling locations for Lakes M0353 (Figure 2.3) and L9341 (Figure 2.4) were determined in the field. Lake bathymetry has not been surveyed for either of these lakes. Sampling site selection was based on aerial observations and with field depth soundings to determine the deepest portion of the lake. These sample site locations were recorded using a hand-held GPS.

2.2 ON-SITE WATER QUALITY PARAMETERS

In situ water quality was measured at three-foot intervals throughout the water column. A tabulation of meter equipment used and associated parameters is presented in Table 2.1.

TABLE 2.1: ON-SITE WATER QUALITY PARAMETERS

Meter	Parameter	Units
YSI 650 MDS	Temperature	°C
	Dissolved Oxygen	mg/L
	Dissolved Oxygen	%
	Salinity	ppt
	Conductivity	µS/cm
	Specific Conductance (calculated)	µS/cm
	Turbidity	NTU


2.2.1 INSTRUMENT CALIBRATION

The primary and backup meters, both YSI 650 MDS handheld units with YSI 6920V2 Sondes sensors, were calibrated according to the manufacturer's specifications. Prior to each day's sampling, a calibration check was performed using tap water to calibrate the dissolved oxygen sensor, as directed by the manufacturer. An optical or Light Dissolved Oxygen (LDO) sensor was used for the dissolved oxygen sampling. Meters would have been recalibrated as per manufacturer's instructions if readings were incorrect. Prior to each field sampling event, the meter was rinsed with native water.

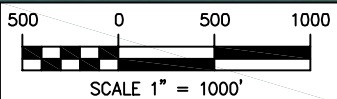


ULAMNIGIAQ
CHANNEL

M9313


N70°25'19.2"
W150°53'58.5"

CD3



 WATER QUALITY
SAMPLING POINT

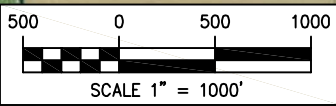
LAKE M9313
ASDP WATER QUALITY
SAMPLING LOCATIONS
FIGURE 2.1
(SHEET 1 OF 1)

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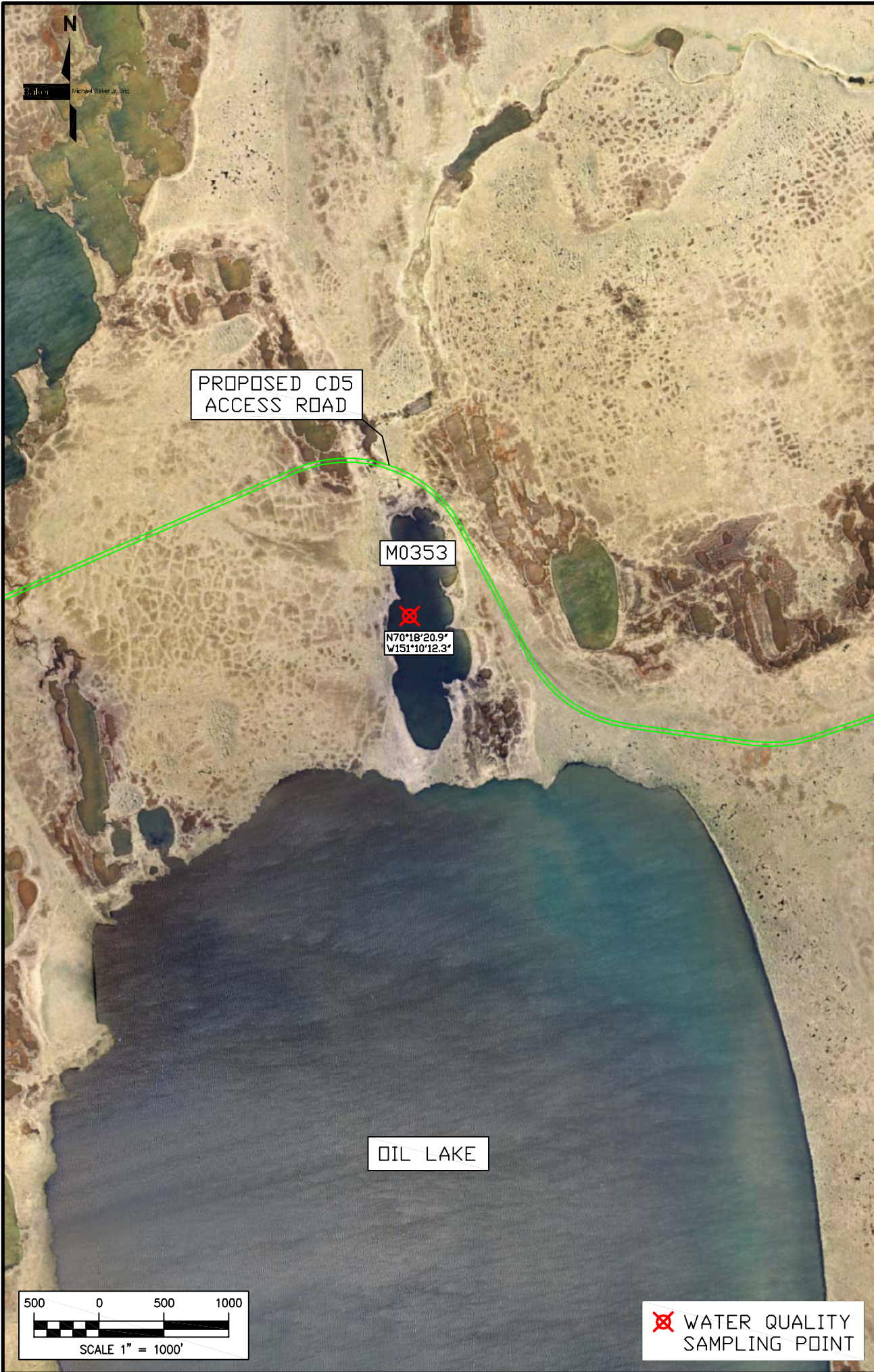
X WATER QUALITY SAMPLING POINT

LAKES L9323 & L9324
 ASDP WATER QUALITY
 SAMPLING LOCATIONS
 FIGURE 2.2
 (SHEET 1 OF 1)

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LAKE M0353
 ASDP WATER QUALITY
 SAMPLING LOCATIONS
 FIGURE 2.3
 (SHEET 1 OF 1)

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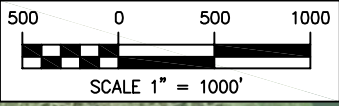
WATER QUALITY SAMPLING POINT



PROPOSED CD5
ACCESS ROAD

L9341

N70°18'07.0"
W151°03'32.0"



 WATER QUALITY
SAMPLING POINT

LAKE L9341
ASDP WATER QUALITY
SAMPLING LOCATIONS
FIGURE 2.4
(SHEET 1 OF 1)

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2.3 LABORATORY SAMPLE COLLECTION AND ANALYSIS

2.3.1 SAMPLE COLLECTION

Prior to laboratory sample collection, in situ sampling was performed to confirm well-mixed water quality constituents within the water column at the sample location. Because neither oxycline (notable change in oxygen values with depth) nor thermocline (notable change in temperature values with depth) was apparent at any of the sampling sites (as demonstrated in Table 3.1), a single point sample was collected at each location from mid-depth. In the event of lake stratification, multiple samples would have been collected throughout the water column and combined for laboratory analysis. Samples were collected from mid-depth of the water column using a 500mL stainless steel bomb sampler. The bomb sampler was given a thorough native-water rinse at each lake prior to sampling to minimize cross-contamination of samples.

Sample bottles provided by SGS were stored in the provided cooler before, during, and after sample collection to maintain adequate storage temperatures. Field samples were transported to SGS within seventy-five hours of collection. The procedures for transport and transfer are described in Appendix A as part of the SGS analysis report.

2.3.2 ANALYTICAL ANALYSIS

2.3.2.1 ADEC AK102 – DIESEL RANGE ORGANICS (DRO)

This method, developed by the Alaska Department of Environmental Conservation (ADEC), is based on a solvent extraction, gas chromatography (GC) procedure for the detection of semi-volatile petroleum products such as diesels. Other nonpetroleum compounds of similar characteristics may be detected with this method. Samples spiked with a surrogate (o-Terphenyl) are extracted with methylene chloride. The GC is temperature programmed to facilitate separation of organic compounds detected by a flame ionization detector (FID). Quantification is based on FID response compared to a diesel calibration standard.

2.3.2.2 ADEC AK103 – RESIDUAL RANGE ORGANICS (RRO)

This method, developed by ADEC, was originally designed to measure lubricating or motor oils and other heavy petroleum products in soils. The ADEC *Underground Storage Tanks Procedures Manual* (ADEC 2002) identifies the method as adequate for determining such compounds in solution. The method is an extension of ADEC AK102, employing solvent extractions and gas chromatographs (GC) to identify heavier residual range organics (RRO). Quantification is based on FID response compared to a residuals calibration standard.

2.3.2.3 SW6020 – RCRA TRACE METALS

This method, developed by the EPA Office of Solid Waste, employs inductively coupled plasma-mass spectrometry (ICP-MS) to determine trace elements, including metals, in solution. Elements tested include arsenic, barium, cadmium, chromium, lead, selenium, and

silver. This method measures ions produced by a radio-frequency inductively coupled plasma. High temperatures are used to produce ions which are then entrained in a plasma gas and extracted. The ions are separated on the basis of their mass-to-charge ratio by a mass spectrometer (MS).

2.3.2.4 SW7470A/E245.1 – MERCURY IN LIQUID WASTE

This EPA method employs a cold-vapor atomic adsorption procedure approved for determining mercury concentration in liquid wastes. Aqueous samples are digested with sulfuric acid, nitric acid, potassium permanganate, and potassium persulfate. The organo-mercury compounds are oxidized to the mercuric ion. Once samples have cooled, the excess permanganate is chemically reduced, as is the elemental mercury, which is immediately measured by a cold-vapor atomic absorption spectrophotometer or equivalent instrument.

2.3.2.5 ADEC AK101--GASOLINE RANGE ORGANICS (GRO)

This method, developed by the ADEC, is based on a purge-and-trap extraction gas chromatography (GC) procedure for the detection of volatile fractions such as gasoline. Other nonpetroleum compounds of similar characteristics may be detected with this method. The GC is temperature programmed to facilitate separation of organic compounds detected by a flame ionization detector (FID). Quantification is based on FID response. The recommended 4-Bromofluorobenzene surrogate was used.

2.3.2.6 SW8260B – VOLATILE ORGANIC COMPOUNDS (VOC)

EPA Method SW 8260B is utilized to evaluate the presences of volatile organic compounds (VOC) by gas chromatography/mass spectrometry (GC/MS). Using a purge-and-trap or similar method, volatile compounds are introduced into a GC. Target analytes are identified by comparing their mass spectra with the electron impact spectra of authentic standards.

2.3.2.7 EPA 1664 – TOTAL PETROLEUM HYDROCARBONS (TPH)

Method 1664, developed by the EPA, was used to test for N-Hexane extractable materials (HEM; oil and grease) and silica gel treated N-Hexane extractable material (SGT-HEM). Extractable materials that may be determined with this method are relatively non-volatile hydrocarbons, vegetable oils, animal fats, waxes, soaps, greases, and related materials. Though some crude oils and heavy fuel oils contain materials not suited for this test, it is the recommended method for testing of total petroleum hydrocarbons (TPH). The method is based on extraction and gravimetric procedures, including sample acidification, isolation, desiccation, and weighing of HEM and SGT-HEM isolates.

2.3.2.8 SW 8270D SIMS – POLYNUCLEAR AROMATIC HYDROCARBONS

EPA Method 8270D is used to determine the concentration of semi-volatile organic compounds by GC/MS. Samples were prepared for analysis by GC/MS using an appropriate sample preparation method. The semi-volatile compounds are injected into the GC. The GC

separates the analytes, which are detected with a MS connected to the GC. Target analytes are identified by comparing their mass spectra with the electron impact spectra of authentic standards. SIM refers to selective ion monitoring. The SIM mode increases the sensitivity relative to the full-scan mode, filtering out unwanted ions. This is particularly useful for trace level quantitative analysis.

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3.0 RESULTS

3.1 FIELD CONDITIONS

3.1.1 AUGUST 4, 2009

On August 4, the temperature ranged from 60 °F to 65 °F. The weather was sunny and hazy due to inland forest fires. Light rain fell in the late afternoon and evening.

3.1.1.1 LAKE M0353

Lake M0353 is located near Oil Lake. Lake M0353 is a shallow lake, with some reeds around the periphery. No oily sheen was noted at the sampling location; however, an oily sheen was noted on small ponded water areas near the lake shore. There was no noticeable odor.

It is worthwhile to note an oily sheen can come from natural sources. As an example, some bacteria grow and decompose, leaving an oily-appearing residue. The USGS website has additional information about naturally occurring oily sheens at <http://pubs.usgs.gov/gip/microbes/>.

Surface connectivity between Lake M0353 and Oil Lake appears to have been possible at some time in the past. Active hydraulic connection was not observed. Sampling was conducted at the site between 9:30 a.m. and 11:50 a.m.



PHOTO 3.1: LAKE M0353 IN FOREGROUND, OIL LAKE IN BACKGROUND. AUGUST 4, 2009.



PHOTO 3.2: OILY SHEEN ON PONDED WATER NEAR LAKE M0353. AUGUST 4, 2009.



PHOTO 3.3: OILY SHEEN ON PONDED WATER NEAR LAKE M0353. AUGUST 4, 2009.

3.1.1.2 LAKE L9341

Lake L9341 is a moderately-sized paleo-channel that is now a lake. Willows dominate a fairly flat east bank. The west bank is steeper with willows as well. No oily sheen was observed. No odor was observed. Lake L9341 was not hydraulically connected to the Nigliq Channel at the time of sampling. The sampling location is located south of the proposed CD5 crossing. Sampling was conducted at the site between 12:00 p.m. and 3:50 p.m.



PHOTO 3.4: LAKE L9341. AUGUST 4, 2009.



PHOTO 3.5: LAKE L9341 SHOWING PROXIMITY TO NIGLIQ CHANNEL. NO HYDRAULIC CONNECTIVITY AT TIME OF SAMPLING. AUGUST 4, 2009.



PHOTO 3.6: SAMPLING ON LAKE L9341. AUGUST 4, 2009.

3.1.1.3 LAKE L9323

Lake L9323 is located near CD4. It is a moderately sized lake with grassy banks and some reeds on the periphery. No hydraulic connectivity with the Nigliq Channel was apparent at the time of sampling. No odor was detected. A slight oily sheen was on the edges of the lake. Fish were observed jumping during sampling event. Sampling was conducted at the site between 4:10 p.m. and 5:35 p.m.



PHOTO 3.7: LAKE L9323. AUGUST 4, 2009.



PHOTO 3.8: LAKE L9323 WITH CD4 IN THE BACKGROUND. AUGUST 4, 2009.

3.1.1.4 LAKE L9324

Lake L9324 is also located near CD4. It is a moderately sized lake with grassy banks and willows. Some large bluffs surround the lake. At the time of sampling, no apparent hydraulic connectivity with any other water body was observed. No odor or oily sheen was observed. Sampling was conducted at the site between 5:40 p.m. and 6:50 p.m. The breeze began to pick up during the sampling of Lake L9324, and it began to rain lightly.



PHOTO 3.9: NORTHERN PORTION OF LAKE L9324 AND CD4. AUGUST 4, 2009.



PHOTO 3.10: SOUTHERN PORTION LAKE L9324. AUGUST 4, 2009.

3.1.2 AUGUST 5, 2009

On August 5, the temperature was 52 °F when sampling began. The weather was sunny with some smoky haze and a slight breeze.

3.1.2.1 LAKE M9313

Lake M9313 is located near CD3. It is a large lake with low grassy banks. No hydraulic connectivity was observed at the time of sampling. Neither odor nor oily sheen was observed on the lake. Some oily sheen was observed on nearby ponded water, approximately 75 feet from the lake shore. Fish were observed jumping during the sampling event. Sampling was conducted at the site between 10:00 a.m. and 11:25 a.m.



PHOTO 3.11: LAKE M9313 AND CD3 FACILITIES. AUGUST 5, 2009.



PHOTO 3.12: OILY SHEEN ON PONDED WATER NEAR LAKE M9313. AUGUST 5, 2009.

3.2 ON-SITE WATER QUALITY RESULTS

The measured water quality results from the August sampling event are tabulated in Table 3.1. The 2008 sampling event measured water quality results are presented in Appendix B. The resulting values are discussed below.

3.2.1 SPECIFIC CONDUCTANCE

Conductivity is a measure of water's ionic activity and content. Measured values of a given water body change substantially with changes in water temperature as resistance, used to measure conductivity, drops with increasing temperature. To adequately compare multiple water sources, conductivity is corrected to a standard temperature of 25°C using the measured water temperature and a standard temperature correction coefficient. Because conductivity was directly measured, resulting values are tabulated in Table 3.1; however, to provide a direct comparison of the five lakes, the calculated specific conductance is used as the basis of discussion.

Specific conductance values varied little within the water column, but were notably different between lakes. The average specific conductance in M9313 was 790 μ S/cm (down 2% from 805 μ S/cm in 2008). Average specific conductance was 112 μ S/cm in L9323 (a 4% decrease from the 116 μ S/cm measured in 2008), and 66 μ S/cm in L9324 (a 15% decrease compared to 78 μ S/cm in 2008.) Overall values were consistent with those observed in August of 2008.

Baseline specific conductance values varied little within the water column at the two CD5 lakes, and were similar between the two lakes. The average specific conductance in M0353 was 267 μ S/cm. Average specific conductance was 365 μ S/cm in L9341.

3.2.2 DISSOLVED OXYGEN AND WATER TEMPERATURE

Overall, DO values varied little between lakes and between sampling years. In 2009, the average DO was measured at 10.60 milligrams per liter (mg/L) in Lake M9313, 10.48mg/L in L9323, and 10.79mg/L in Lake L9324. At the two CD5 lakes, average DO was 10.88mg/L in M0353 and 11.87mg/L in L9341.

A 100% saturation level is based on standard temperature and pressure conditions. The percent-saturation (%-saturation) at each CD3 and CD4 lake was 101.7% (M9313), 103.8% (L9323), and 109.0% (L9324). The %-saturation at the two CD5 lakes was 110.4% at M0353 and 119.4% at L9341. Variation from standard values can result in DO concentrations greater than 100%. No significant oxycline was apparent within the sampled water columns. It is interesting to note that dissolved oxygen as percent saturation increased with depth at L9341.

No significant thermocline was apparent within the sampled water columns. Temperatures in all five lakes ranged from 12.1°C in M9313 to 16.4°C in L9324. These were the high and low temperature lakes from 2008 as well. Comparing just the two CD5 lakes, M0353 and L9341,

temperatures ranged from 15.3°C in L9341 to 16.1°C in M0353. The coolest temperatures were noted in the deepest lakes, M9313 and L9323.

TABLE 3.1: ON-SITE WATER QUALITY RESULTS, AUGUST 4 AND 5, 2009.

Lake Location Time	Depth (ft)	Turbidity NTU	Depth (ft)	Temp (°C)	Conductivity (µS/cm)	Specific Conductance (µS/cm)	DO (mg/L)	DO (Percent Saturation)	Salinity (ppt)
Sample Date: August 4, 2009									
M0353 N70°18'20.9" W151°10'12.3" 10:40 a.m.	4.0	0.42	Surface	16.1	220	267	10.88	110.4	0.13
			1.0	16.0	220	267	10.81	109.6	0.13
			2.0	16.0	220	267	10.91	110.7	0.13
			3.0	16.0	220	267	10.92	110.8	0.13
			3.5	16.0	220	267	10.88	110.4	0.13
L9341 N70°18'07.0" W151°03'32.0" 12:50 p.m.	10.0	0.75	Surface	15.8	300	366	11.44	115.6	0.17
			2.0	15.7	299	366	11.48	115.7	0.17
			4.0	15.7	299	366	11.47	115.6	0.17
			6.0	15.4	296	365	11.90	120.0	0.17
			8.0	15.3	294	363	12.45	125.3	0.17
			9.0	15.3	293	362	12.50	124.3	0.17
L9323 N70°17'45.8" W150°59'18.4" 4:40 p.m.	19.5	0.98	Surface	15.8	91	111	10.72	108.2	0.05
			2.0	15.7	91	111	10.71	107.9	0.05
			4.0	15.2	90	111	10.75	107.2	0.05
			6.0	15.1	90	112	10.75	106.8	0.05
			8.0	15.0	90	112	10.71	106.3	0.05
			10.0	15.0	90	112	10.60	105.0	0.05
			12.0	14.8	90	112	10.53	104.1	0.05
			14.0	14.7	89	112	10.53	103.7	0.05
			16.0	14.6	89	112	10.43	102.6	0.05
			18.0	14.2	88	112	9.77	95.2	0.05
			19.0	14.0	88	112	9.76	95.0	0.05
L9324 N70°17'24.5" W150°59'00.6" 6:15 p.m.	9.1	1.52	Surface	16.4	55	66	10.61	108.3	0.03
			2.0	16.3	55	66	10.63	108.5	0.03
			4.0	16.1	55	67	10.72	109.0	0.03
			6.0	15.7	54	66	10.92	110.0	0.03
			8.0	15.3	53	65	10.91	109.0	0.03
			8.5	15.3	53	65	10.93	109.1	0.03
Sample Date: August 5, 2009									
M9313 N70°25'19.2" W150°53'58.5" 10:35 a.m.	23.5	0.83	Surface	14.0	619	788	10.77	104.8	0.39
			2.0	14.0	619	789	10.78	104.9	0.39
			4.0	14.0	619	789	10.78	104.9	0.39
			6.0	14.0	619	789	10.77	104.7	0.39
			8.0	13.9	617	789	10.77	104.5	0.39
			10.0	13.8	616	789	10.75	104.1	0.39
			12.0	13.7	615	789	10.70	103.5	0.39
			14.0	13.5	612	789	11.10	106.8	0.39
			16.0	13.1	606	790	10.96	104.5	0.39
			18.0	12.8	601	790	10.66	100.9	0.39
			20.0	12.5	598	792	10.36	97.3	0.39
			22.0	12.1	594	795	9.76	91.0	0.39
			23.0	12.1	595	796	9.70	90.5	0.39
Notes: (1) Sample depth is measured from the water surface. (2) Turbidity, temperature, conductivity, dissolved oxygen, and salinity were measured using a YSI 6920V2-M meter. (3) Turbidity is presented as an average of the sampled values in the water column. (4) Specific conductance (referenced to 25°C) was obtained using a conversion coefficient of 0.0196 based on empirical data.									

3.2.3 SALINITY

With regard to the CD3 and CD4 lakes, salinity remained consistent with depth and between sampling years. The greatest value was measured in M9313 at 0.39 parts per thousand (ppt). This compares with a similar value of 0.4 ppt in 2008, likely due to the close proximity of the lake to the coast. Lakes L9323 and L9324 had no notable salinity with values less than or equal to 0.05 ppt.

Salinity values in CD5 Lakes M0353 and L9341 were 0.13 and 0.17 ppt, respectively. Salinity was consistent in the water column in each lake.

3.2.4 TURBIDITY

Turbidity was variable between lakes and monitoring years. Turbidity was sampled at the same increments as other in situ water quality parameters, however it is presented as an average of the sampled values in the water column. Reported values decreased 50% from 1.96 NTU in 2008 to 0.98 NTU in 2009 at L9323. At L9324, turbidity decreased 55% from 3.4 NTU in 2008 to 1.52 NTU in 2009. Lake M9313 saw a 22% increase in turbidity from a 2008 value of 0.65 NTU to 0.83 NTU in 2009.

3.3 LABORATORY FINDINGS

Water quality samples for ex situ laboratory analyses were taken at mid-depth in each water column. Results from ex situ laboratory analyses are tabulated in Table 3.2 through Table 3.6. Analytical results provided by SGS are presented in Appendix A.

3.3.1 LAKES M9313, L9323, AND L9324

Water quality results are tabulated in Table 3.2 for Lake M9313; Table 3.3 for Lake L9323; and Table 3.4 for Lake L9324. Laboratory analyses results for the 2008 sampling events for Lakes M9313, L9323, and L9324 are presented in Appendix B. The resulting values are summarized and compared for these three lakes below.

All of the targeted compounds and metals were non-detectable (ND) in all three lakes except for low levels of barium. Barium was detected in all lakes, at levels consistent with the 2008 laboratory values. The greatest measured concentration was 0.232mg/L; well below the water quality standard of 2mg/L identified by the EPA (EPA 2006) and adopted in the Alaska Water Quality Criteria Manual for Toxic and Other Deleterious Organic and Inorganic Substances (ADEC 2008). Barium concentrations remained largely unchanged in Lake M9313, increasing from 0.23 to 0.232mg/L. The lab result in 2008 was not carried to the thousandth, so this difference may not exist, or is very small. Barium increased slightly from 0.05 to 0.06mg/L in Lake L9323, and decreased from 0.047 to 0.043mg/L in Lake L9324. Chromium, detected in Lake L9324 in August 2007, was not detected in 2008 or 2009.

TABLE 3.2: LAKE M9313 LABORATORY ANALYSIS RESULTS

Lab Sample Number	Test Method	Analysis	Concentration	Units	PQL	Lower Limit	Upper Limit
1094060003A	SW7470A/E245.1	Mercury	ND	mg/L	0.00020	-	-
1094060003B	ADEC AK103-RRO	Residual Range Organics <i>n-Triacontane-d62</i>	ND 90.8	mg/L %	0.543	- 50	- 150
1094060003B	ADEC AK102-DRO	Diesel Range Organics <i>5a Androstane</i>	ND 77.4	mg/L %	0.870	- 50	- 120
1094060003A	SW6010B-ICP-RCRA	Arsenic	ND	mg/L	0.005	-	-
		Barium	0.232	mg/L	0.003	-	-
		Cadmium	ND	mg/L	0.002	-	-
		Chromium	ND	mg/L	0.004	-	-
		Lead	ND	mg/L	0.001	-	-
		Selenium	ND	mg/L	0.002	-	-
		Silver	ND	mg/L	0.002	-	-

Notes:
(1) PQL: Practical Quantification Limit
(2) Values provided by SGS as ug/L were converted to mg/L for comparison with previous years' values.
(3) *Surrogates are italicized*

TABLE 3.3: LAKE L9323 LABORATORY ANALYSIS RESULTS

Lab Sample Number	Test Method	Analysis	Concentration	Units	PQL	Lower Limit	Upper Limit
1094060001A	SW7470A/E245.1	Mercury	ND	mg/L	0.00020	-	-
1094060001B	ADEC AK103-RRO	Residual Range Organics <i>n-Triacontane-d62</i>	ND 77.2	mg/L %	0.543	- 50	- 150
1094060001B	ADEC AK102-DRO	Diesel Range Organics <i>5a Androstane</i>	ND 69.9	mg/L %	0.870	- 50	- 120
1094060001A	SW6010B-ICP-RCRA	Arsenic	ND	mg/L	0.005	-	-
		Barium	0.055	mg/L	0.003	-	-
		Cadmium	ND	mg/L	0.002	-	-
		Chromium	ND	mg/L	0.004	-	-
		Lead	ND	mg/L	0.001	-	-
		Selenium	ND	mg/L	0.002	-	-
		Silver	ND	mg/L	0.002	-	-

Notes:
(1) PQL: Practical Quantification Limit
(2) Values provided by SGS as ug/L were converted to mg/L for comparison with previous years' values.
(3) *Surrogates are italicized*

TABLE 3.4: LAKE L9324 LABORATORY ANALYSIS RESULTS

Lab Sample Number	Test Method	Analysis	Concentration	Units	PQL	Lower Limit	Upper Limit
1094060002A	SW7470A/E245.1	Mercury	ND	mg/L	0.00020	-	-
1094060002B	ADEC AK103-RRO	Residual Range Organics <i>n-Triacontane-d62</i>	ND 78	mg/L %	0.543	- 50	- 150
1094060002B	ADEC AK102-DRO	Diesel Range Organics <i>5a Androstane</i>	ND 71.4	mg/L %	0.870	- 50	- 120
1094060002A	SW6010B-ICP-RCRA	Arsenic	ND	mg/L	0.005	-	-
		Barium	0.043	mg/L	0.003	-	-
		Cadmium	ND	mg/L	0.002	-	-
		Chromium	ND	mg/L	0.004	-	-
		Lead	ND	mg/L	0.001	-	-
		Selenium	ND	mg/L	0.002	-	-
		Silver	ND	mg/L	0.002	-	-
Notes:							
(1) PQL: Practical Quantification Limit							
(2) Values provided by SGS as ug/L were converted to mg/L for comparison with previous years' values.							
(3) <i>Surrogates are italicized</i>							

3.3.2 LAKES M0353 AND L9341

Water quality results are tabulated in Table 3.5 for Lake M0353 and Table 3.6 for Lake L9341.

TABLE 3.5: LAKE M0353 LABORATORY ANALYSIS RESULTS

Lab Sample Number	Test Method	Analysis	Concentration	Units	PQL	Lower Limit	Upper Limit
1094060005G	SW7470A/E245.1	Mercury	ND	mg/L	0.00020	-	-
1094060005J	ADEC AK103-RRO	Residual Range Organics <i>n-Triacontane-d62</i>	ND 82.8	mg/L %	0.549	- 50	- 150
1094060005J	ADEC AK102-DRO	Diesel Range Organics <i>5a Androstane</i>	ND 74.2	mg/L %	0.879	- 50	- 120
1094060005G	SW6010B-ICP-RCRA	Arsenic Barium Cadmium Chromium Lead Selenium Silver	ND 0.166 ND ND ND ND ND	mg/L mg/L mg/L mg/L mg/L mg/L mg/L	0.005 0.003 0.002 0.004 0.001 0.002 0.002	- - - - - - -	- - - - - - -
1094060005L	EPA 1664A	TPH Silica Gel HPM (4)	ND	mg/L	4.28	-	-
1094060005D	ADEC AK101GRRO	Gasoline Range Organics <i>4-Bromofluorobenzene</i>	ND 128	mg/L %	0.1	- 50	- 150
1094060005H	8270D SIMS	Polynuclear Aromatic Hydrocarbons Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benzo(a)Anthracene Chrysene Benzo[b]Fluoranthene Benzo[k]fluoranthene Benzo[a]pyrene Indeno[1,2,3-c,d]pyrene Dibenzo[a,h]anthracene Benzo[g,h,i]perylene Naphthalene 1-Methylnaphthalene 2-Methylnaphthalene <i>Terphenyl-d14</i>	ND 77.3	ug/L %	0.0538 0.0538 0.0538 0.0538 0.0538 0.0538 0.0538 0.0538 0.0538 0.0538 0.0538 0.0538 0.0538 0.0538 0.0538 0.0538 0.0538 0.108 0.0538 0.0538 50	- 50	- 135

TABLE 3.5: LAKE M0353 LABORATORY ANALYSIS RESULTS (CONT'D)

Lab Sample Number	Test Method	Analysis	Concentration	Units	PQL	Lower Limit	Upper Limit
1094060005B	SW 8260B	Volatile Organic Compounds					
		Benzene	ND	mg/L	0.0004	-	-
		Toluene	ND	mg/L	0.001	-	-
		Ethylbenzene	ND	mg/L	0.001	-	-
		n-Butylbenzene	ND	mg/L	0.001	-	-
		Carbon disulfide	ND	mg/L	0.002	-	-
		1,2-Dichlorobenzene	ND	mg/L	0.0005	-	-
		1,2-Dichloroethane	ND	mg/L	0.0005	-	-
		1,3,5-Trimethylbenzene	ND	mg/L	0.001	-	-
		4-Chlorotoluene	ND	mg/L	0.001	-	-
		Chlorobenzene	ND	mg/L	0.0005	-	-
		4-Methyl-2-pentanone (MIBK)	ND	mg/L	0.01	-	-
		cis-1,3-Dichloroethene	ND	mg/L	0.001	-	-
		4-Isopropyltoluene	ND	mg/L	0.001	-	-
		cis-1,3-Dichloropropene	ND	mg/L	0.0005	-	-
		n-Propylbenzene	ND	mg/L	0.001	-	-
		Styrene	ND	mg/L	0.001	-	-
		Dibromomethane	ND	mg/L	0.001	-	-
		trans-1,3-Dichloropropene	ND	mg/L	0.001	-	-
		1,2,4-Trichlorobenzene	ND	mg/L	0.001	-	-
		1,1,2,2-Tetrachloroethane	ND	mg/L	0.0005	-	-
		1,2-Dibromo-3-chloropropane	ND	mg/L	0.002	-	-
		Methyl-t-butyl ether	ND	mg/L	0.005	-	-
		Tetrachloroethene	ND	mg/L	0.001	-	-
		Dibromochloromethane	ND	mg/L	0.0005	-	-
		1,3-Dichloropropane	ND	mg/L	0.0004	-	-
		1,2-Dibromoethane	ND	mg/L	0.001	-	-
		Carbon tetrachloride	ND	mg/L	0.001	-	-
		1,1,1,2-Tetrachloroethane	ND	mg/L	0.0005	-	-
		Chloroform	ND	mg/L	0.001	-	-
Bromobenzene	ND	mg/L	0.001	-	-		
1,2,3-Trichloropropane	ND	mg/L	0.001	-	-		
Chloromethane	ND	mg/L	0.001	-	-		
Bromomethane	ND	mg/L	0.003	-	-		
Bromochloromethane	ND	mg/L	0.001	-	-		

TABLE 3.5: LAKE M0353 LABORATORY ANALYSIS RESULTS (CONT'D)

Lab Sample Number	Test Method	Analysis	Concentration	Units	PQL	Lower Limit	Upper Limit
1094060005B	SW 8260B	Volatile Organic Compounds (cont'd)					
		Vinyl chloride	ND	mg/L	0.001	-	-
		Dichlorodifluoromethane	ND	mg/L	0.001	-	-
		Chloroethane	ND	mg/L	0.001	-	-
		sec-Butylbenzene	ND	mg/L	0.001	-	-
		Bromodichloromethane	ND	mg/L	0.0005	-	-
		1,1-Dichloroethene	ND	mg/L	0.001	-	-
		2-Butanone (MEK)	ND	mg/L	0.01	-	-
		Methylene chloride	ND	mg/L	0.005	-	-
		Trichlorofluoromethane	ND	mg/L	0.001	-	-
		P & M -Xylene	ND	mg/L	0.002	-	-
		Naphthalene	ND	mg/L	0.002	-	-
		o-Xylene	ND	mg/L	0.001	-	-
		Bromoform	ND	mg/L	0.001	-	-
		Xylenes (total)	ND	mg/L	0.002	-	-
		1,2,4-Trimethylbenzene	ND	mg/L	0.001	-	-
		tert-Butylbenzene	ND	mg/L	0.001	-	-
		1,1,1-Trichloroethane	ND	mg/L	0.001	-	-
		1,1-Dichloroethane	ND	mg/L	0.001	-	-
		2-Chlorotoluene	ND	mg/L	0.001	-	-
		Trichloroethene	ND	mg/L	0.001	-	-
		trans-1,2-Dichloroethene	ND	mg/L	0.001	-	-
		1,2-Dichlorobenzene	ND	mg/L	0.001	-	-
		2,2-Dichloropropane	ND	mg/L	0.001	-	-
		Hexachlorobutadiene	ND	mg/L	0.001	-	-
		Isopropylbenzene (Cumene)	ND	mg/L	0.001	-	-
		2-Hexanone	ND	mg/L	0.01	-	-
		1,2-Dichloropropane	ND	mg/L	0.001	-	-
		1,1-Dichloropropene	ND	mg/L	0.001	-	-
		1,1,2-Trichloroethane	ND	mg/L	0.001	-	-
1,3-Dichlorobenzene	ND	mg/L	0.001	-	-		
1,2,3-Trichlorobenzene	ND	mg/L	0.001	-	-		
<i>1,2-Dichloroethane-D4</i>	121(5)	%			73	120	
<i>Toluene-d8</i>	100	%			80	120	
<i>4-Bromofluorobenzene</i>	104	%			76	120	
Notes:							
(1) PQL: Practical Quantification Limit							
(2) Values provided by SGS as ug/L were covered to mg/L, with the exception of PAH.							
(3) <i>Surrogates are italicized</i>							
(4) 1664 TPH - Due to lab error the sample was analyzed at a temperature in excess of 6 °C. The acid preservation would have prevented significant degradation but the results may be biased low.							
(5) 8260B 1,2-dichloroethane-d4 surrogate recovery does not meet QC criteria (biased high). All target analyses associated with this surrogate were not detected above the POL.							

TABLE 3.6: LAKE L9341 LABORATORY ANALYSIS RESULTS

Lab Sample Number	Test Method	Analysis	Concentration	Units	PQL	Lower Limit	Upper Limit
1094060005G	SW7470A/E245.1	Mercury	ND	mg/L	0.00020	-	-
1094060005J	ADEC AK103-RRO	Residual Range Organics <i>n-Triacontane-d62</i>	ND 81	mg/L %	0.538	- 50	- 150
1094060005J	ADEC AK102-DRO	Diesel Range Organics <i>5a Androstane</i>	ND 73.4	mg/L %	0.860	- 50	- 120
1094060005G	SW6010B-ICP-RCRA	Arsenic Barium Cadmium Chromium Lead Selenium Silver	ND 0.0858 ND ND ND ND ND	mg/L mg/L mg/L mg/L mg/L mg/L mg/L	0.005 0.003 0.002 0.004 0.001 0.002 0.002	- - - - - - -	- - - - - - -
1094060005L	EPA 1664A	TPH Silica Gel HPM (4)	ND	mg/L	4.3	-	-
1094060005D	ADEC AK101GRRO	Gasoline Range Organics <i>4-Bromofluorobenzene</i>	ND 123	mg/L %	0.1	- 50	- 150
1094060005H	8270D SIMS	Polynuclear Aromatic Hydrocarbons Acenaphthylene Acenaphthene Fluorene Phenanthrene Anthracene Fluoranthene Pyrene Benzo(a)Anthracene Chrysene Benzo(b)Fluoranthene Benzo(k)fluoranthene Benzo[a]pyrene Indeno[1,2,3-c,d]pyrene Dibenzo[a,h]anthracene Benzo[g,h,i]perylene Naphthalene 1-Methylnaphthalene 2-Methylnaphthalene <i>Terphenyl-d14</i>	ND 74.7	ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L ug/L %	0.0543 0.0543 0.0543 0.0543 0.0543 0.0543 0.0543 0.0543 0.0543 0.0543 0.0543 0.0543 0.0543 0.0543 0.0543 0.0543 0.0543 0.109 0.0543 0.0543 -	- 50	- 135

TABLE 3.6: LAKE L9341 LABORATORY ANALYSIS RESULTS (CONT'D)

Lab Sample Number	Test Method	Analysis	Concentration	Units	PQL	Lower Limit	Upper Limit
1094060005B	SW 8260B	Volatile Organic Compounds					
		Benzene	ND	mg/L	0.0004	-	-
		Toluene	ND	mg/L	0.001	-	-
		Ethylbenzene	ND	mg/L	0.001	-	-
		n-Butylbenzene	ND	mg/L	0.001	-	-
		Carbon disulfide	ND	mg/L	0.002	-	-
		1,2-Dichlorobenzene	ND	mg/L	0.0005	-	-
		1,2-Dichloroethane	ND	mg/L	0.0005	-	-
		1,3,5-Trimethylbenzene	ND	mg/L	0.001	-	-
		4-Chlorotoluene	ND	mg/L	0.001	-	-
		Chlorobenzene	ND	mg/L	0.0005	-	-
		4-Methyl-2-pentanone (MIBK)	ND	mg/L	0.01	-	-
		cis-1,3-Dichloroethene	ND	mg/L	0.001	-	-
		4-Isopropyltoluene	ND	mg/L	0.001	-	-
		cis-1,3-Dichloropropene	ND	mg/L	0.0005	-	-
		n-Propylbenzene	ND	mg/L	0.001	-	-
		Styrene	ND	mg/L	0.001	-	-
		Dibromomethane	ND	mg/L	0.001	-	-
		trans-1,3-Dichloropropene	ND	mg/L	0.001	-	-
		1,2,4-Trichlorobenzene	ND	mg/L	0.001	-	-
		1,1,2,2-Tetrachloroethane	ND	mg/L	0.0005	-	-
		1,2-Dibromo-3-chloropropane	ND	mg/L	0.002	-	-
		Methyl-t-butyl ether	ND	mg/L	0.005	-	-
		Tetrachloroethene	ND	mg/L	0.001	-	-
		Dibromochloromethane	ND	mg/L	0.0005	-	-
		1,3-Dichloropropane	ND	mg/L	0.0004	-	-
		1,2-Dibromoethane	ND	mg/L	0.001	-	-
		Carbon tetrachloride	ND	mg/L	0.001	-	-
		1,1,1,2-Tetrachloroethane	ND	mg/L	0.0005	-	-
		Chloroform	ND	mg/L	0.001	-	-
Bromobenzene	ND	mg/L	0.001	-	-		
1,2,3-Trichloropropane	ND	mg/L	0.001	-	-		
Chloromethane	ND	mg/L	0.001	-	-		
Bromomethane	ND	mg/L	0.003	-	-		
Bromochloromethane	ND	mg/L	0.001	-	-		

TABLE 3.6: LAKE L9341 LABORATORY ANALYSIS RESULTS (CONT'D)

Lab Sample Number	Test Method	Analysis	Concentration	Units	PQL	Lower Limit	Upper Limit
1094060005B	SW 8260B	Volatile Organic Compounds (cont'd)					
		Vinyl chloride	ND	mg/L	0.001	-	-
		Dichlorodifluoromethane	ND	mg/L	0.001	-	-
		Chloroethane	ND	mg/L	0.001	-	-
		sec-Butylbenzene	ND	mg/L	0.001	-	-
		Bromodichloromethane	ND	mg/L	0.0005	-	-
		1,1-Dichloroethene	ND	mg/L	0.001	-	-
		2-Butanone (MEK)	ND	mg/L	0.01	-	-
		Methylene chloride	ND	mg/L	0.005	-	-
		Trichlorofluoromethane	ND	mg/L	0.001	-	-
		P & M -Xylene	ND	mg/L	0.002	-	-
		Naphthalene	ND	mg/L	0.002	-	-
		o-Xylene	ND	mg/L	0.001	-	-
		Bromoform	ND	mg/L	0.001	-	-
		Xylenes (total)	ND	mg/L	0.002	-	-
		1,2,4-Trimethylbenzene	ND	mg/L	0.001	-	-
		tert-Butylbenzene	ND	mg/L	0.001	-	-
		1,1,1-Trichloroethane	ND	mg/L	0.001	-	-
		1,1-Dichloroethane	ND	mg/L	0.001	-	-
		2-Chlorotoluene	ND	mg/L	0.001	-	-
		Trichloroethene	ND	mg/L	0.001	-	-
		trans-1,2-Dichloroethene	ND	mg/L	0.001	-	-
		1,2-Dichlorobenzene	ND	mg/L	0.001	-	-
		2,2-Dichloropropane	ND	mg/L	0.001	-	-
		Hexachlorobutadiene	ND	mg/L	0.001	-	-
		Isopropylbenzene (Cumene)	ND	mg/L	0.001	-	-
		2-Hexanone	ND	mg/L	0.01	-	-
		1,2-Dichloropropane	ND	mg/L	0.001	-	-
		1,1-Dichloropropene	ND	mg/L	0.001	-	-
		1,1,2-Trichloroethane	ND	mg/L	0.001	-	-
1,3-Dichlorobenzene	ND	mg/L	0.001	-	-		
1,2,3-Trichlorobenzene	ND	mg/L	0.001	-	-		
<i>1,2-Dichloroethane-D4</i>	107	%			73	120	
<i>Toluene-d8</i>	98.4	%			80	120	
<i>4-Bromofluorobenzene</i>	101	%			76	120	
Notes:							
(1) PQL: Practical Quantification Limit							
(2) Values provided by SGS as ug/L were converted to mg/L, with the exception of PAH.							
(3) <i>Surrogates are italicized</i>							
(4) 1664 TPH - Due to lab error the sample was analyzed at a temperature in excess of 6 °C.							
The acid preservation would have prevented significant degradation but the results may be biased low.							

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4.0 DISCUSSION

Overall, in situ water quality parameters varied little with depth. For the three lakes evaluated in 2008, in situ water quality parameters varied little between 2008 and 2009.

Turbidity was variable between the lakes and between monitoring years. Generally speaking, aquatic organisms are not affected by turbidity less than 10 NTU. The maximum turbidity observed in 2009 was 1.5 NTU. Turbidity is a measure of the concentration of total suspended solids (TSS) in a water body. The greatest source of turbidity in the open water zone of most lakes is typically phytoplankton or algae. Algal turbidity varies seasonally and with depth in a complex manner in response to natural physical, chemical, and biological changes in a lake and cannot be directly linked to development activities.

The lab reported that analysis for TPH done at Lakes M0353 and L9341 was conducted at a temperature in excess of 6 °C. According to SGS, the acid preservation would have prevented significant degradation, but the results may be biased low. Results for TPH were non-detectable for both M9313 and L9341.

A surrogate, as shown in italics in the tables, is a known quantity of a compound that the laboratory injects into the sample prior to the analysis. The amount of the surrogate recovered during the analysis has to fall within a certain percentage to meet Quality Control (QC goals). The surrogate analyzed for VOCs at Lake M0353 was reported slightly above the QC limit. The value of 121% was above the allowable limit range of 73-120%. Therefore, the lab cannot rely on the surrogate recovery for QC purposes in this instance. However, since the target analytes associated with the surrogate, 1,2-Dichloroethane-D4, were not detectable above the reporting limit, the surrogate recovery is not an issue.

Laboratory analysis of lake water samples yielded no evidence of targeted contaminants at any lake, except for barium. Barium was identified in all five of the sample lakes at concentrations below federal and state water quality standards. Barium values were consistent with levels detected in 2008 at Lakes M9313, L9323, and L9324. Lake M9313 had the highest barium concentration at 0.232mg/L, increasing only 1% from the 0.23mg/L reported in 2008. Barium levels at Lakes L9323 and L9324 were 0.055mg/L and 0.043mg/L. While barium levels in CD5 Lakes M0353 and L9341 were higher than L9323 and L9324, the values were not as high as M9313. Barium levels at M0353 and L9341 were 0.166mg/L and 0.0858mg/L respectively. Barium is not uncommon in arctic waters at concentrations similar to those presented here (Guay and Falkner 1998).

The results of these analyses suggest the gravel access roads and pads for CD3 and CD4 have no measureable impact to the water quality of adjacent lakes. These analyses also serve as a baseline for water quality at lakes adjacent to the proposed CD5 access road.

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5.0 REFERENCES

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- Guay, C.K. and K.K. Falkner. 1998. A Survey of Dissolved Barium in the Estuaries of Major Arctic Rivers and Adjacent Seas. *Continental Shelf Research* 18:8 859-882.
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- Moulton, L.L. 2004. Monitoring of Water-Source Lakes in the Alpine Development Project: 1992-2003. January 2004. MJM Research. Prepared for ConocoPhillips Alaska, Inc.
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- Ward, J.R. and C.A. Harr eds. 1990. Methods for Collection and Processing Surface-Water and Bed-Material Samples for Physical and Chemical Analyses. Open-File Report 90-147.

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Appendix A 2009 LABORATORY WATER QUALITY ANALYSIS RESULTS

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Laboratory Analysis Report

200 W. Potter Drive
Anchorage, AK 99518-1605
Tel: (907) 562-2343
Fax: (907) 561-5301
Web: <http://www.us.sgs.com>

Julie Shewman
Michael Baker Jr., Inc.
1400 West Benson Blvd, Ste 200
Anchorage, AK 99503

Work Order:	1094060	
	ASDP WQ	Released by:
Client:	Michael Baker Jr., Inc.	
Report Date:	August 26, 2009	

Enclosed are the analytical results associated with the above workorder.

As required by the state of Alaska and the USEPA, a formal Quality Assurance/Quality Control Program is maintained by SGS. A copy of our Quality Assurance Plan (QAP), which outlines this program, is available at your request.

The laboratory certification numbers are AK971-05 (DW), UST-005 (CS) and AK00971 (Micro) for ADEC and AK100001 for NELAP (RCRA methods: 1020A, 1311, 6010B, 7470A, 7471A, 9040B, 9045C, 9056, 9060, 9065, 8015B, 8021B, 8081A/8082, 8260B, 8270C).

Except as specifically noted, all statements and data in this report are in conformance to the provisions set forth by the SGS QAP, the National Environmental Laboratory Accreditation Program and, when applicable, other regulatory authorities.

If you have any questions regarding this report or if we can be of any other assistance, please contact your SGS Project Manager at 907-562-2343. All work is being provided under SGS general terms and conditions (http://www.sgs.com/terms_and_conditions.htm) unless other written agreements have been accepted by both parties.

PQL	Practical Quantitation Limit (reporting limit).
U	Indicates the analyte was analyzed for but not detected.
F	Indicates value that is greater than or equal to the MDL.
J	The quantitation is an estimation.
ND	Indicates the analyte is not detected.
B	Indicates the analyte is found in a blank associated with the sample.
*	The analyte has exceeded allowable regulatory or control limits.
GT	Greater Than
D	The analyte concentration is the result of a dilution.
LT	Less Than
!	Surrogate out of control limits.
Q	QC parameter out of acceptance range.
M	A matrix effect was present.
JL	The analyte was positively identified, but the quantitation is a low estimation.
E	The analyte result is above the calibrated range.
R	Rejected

Note: Sample summaries which include a result for "Total Solids" have already been adjusted for moisture content.



SGS Ref.# 1094060001
Client Name Michael Baker Jr., Inc.
Project Name/# ASDP WQ
Client Sample ID L9323
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 08/26/2009 7:38
Collected Date/Time 08/04/2009 16:45
Received Date/Time 08/07/2009 13:45
Technical Director Stephen C. Ede

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
<u>Metals Department</u>									
Mercury	ND	0.200	ug/L	SW7470A/E245.1	A		08/19/09	08/19/09	KAR
<u>Metals by ICP/MS</u>									
Arsenic	ND	5.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
Barium	55.2	3.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
Cadmium	ND	2.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
Chromium	ND	4.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
Lead	ND	1.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
Selenium	ND	2.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
Silver	ND	2.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
<u>Semivolatile Organic Fuels Department</u>									
Diesel Range Organics	ND	870	ug/L	AK102	B		08/10/09	08/10/09	KDC
Residual Range Organics	ND	543	ug/L	AK103	B		08/10/09	08/10/09	KDC
<u>Surrogates</u>									
5a Androstane <surr>	69.9		%	AK102	B	50-150	08/10/09	08/10/09	KDC
n-Triacontane-d62 <surr>	77.2		%	AK103	B	50-150	08/10/09	08/10/09	KDC



SGS Ref.# 1094060002
Client Name Michael Baker Jr., Inc.
Project Name/# ASDP WQ
Client Sample ID L9324
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 08/26/2009 7:38
Collected Date/Time 08/04/2009 18:10
Received Date/Time 08/07/2009 13:45
Technical Director Stephen C. Ede

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
<u>Metals Department</u>									
Mercury	ND	0.200	ug/L	SW7470A/E245.1	A		08/19/09	08/19/09	KAR
<u>Metals by ICP/MS</u>									
Arsenic	ND	5.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
Barium	43.4	3.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
Cadmium	ND	2.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
Chromium	ND	4.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
Lead	ND	1.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
Selenium	ND	2.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
Silver	ND	2.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
<u>Semivolatile Organic Fuels Department</u>									
Diesel Range Organics	ND	879	ug/L	AK102	B		08/10/09	08/10/09	KDC
Residual Range Organics	ND	549	ug/L	AK103	B		08/10/09	08/10/09	KDC
<u>Surrogates</u>									
5a Androstane <surr>	71.4		%	AK102	B	50-150	08/10/09	08/10/09	KDC
n-Triacontane-d62 <surr>	78		%	AK103	B	50-150	08/10/09	08/10/09	KDC



SGS Ref.# 1094060003
Client Name Michael Baker Jr., Inc.
Project Name/# ASDP WQ
Client Sample ID M9313
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 08/26/2009 7:38
Collected Date/Time 08/05/2009 10:40
Received Date/Time 08/07/2009 13:45
Technical Director Stephen C. Ede

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
<u>Metals Department</u>									
Mercury	ND	0.200	ug/L	SW7470A/E245.1	A		08/19/09	08/19/09	KAR
<u>Metals by ICP/MS</u>									
Arsenic	ND	5.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
Barium	232	3.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
Cadmium	ND	2.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
Chromium	ND	4.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
Lead	ND	1.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
Selenium	ND	2.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
Silver	ND	2.00	ug/L	SW6020	A		08/13/09	08/19/09	NRB
<u>Semivolatile Organic Fuels Department</u>									
Diesel Range Organics	ND	870	ug/L	AK102	B		08/10/09	08/10/09	KDC
Residual Range Organics	ND	543	ug/L	AK103	B		08/10/09	08/10/09	KDC
<u>Surrogates</u>									
5a Androstane <surr>	77.4		%	AK102	B	50-150	08/10/09	08/10/09	KDC
n-Triacontane-d62 <surr>	90.8		%	AK103	B	50-150	08/10/09	08/10/09	KDC



SGS Ref.# 1094060004
Client Name Michael Baker Jr., Inc.
Project Name/# ASDP WQ
Client Sample ID L9341
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 08/26/2009 7:38
Collected Date/Time 08/04/2009 13:00
Received Date/Time 08/07/2009 13:45
Technical Director Stephen C. Ede

Sample Remarks:

1664 TPH - Due to lab error the sample was analyzed at a temperature in excess of 6 degrees celcius. The acid preservation would have prevented significant degradation but the results may be biased low.

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
<u>Metals Department</u>									
Mercury	ND	0.200	ug/L	SW7470A/E245.1	G		08/19/09	08/19/09	KAR
<u>Metals by ICP/MS</u>									
Arsenic	ND	5.00	ug/L	SW6020	G		08/13/09	08/19/09	NRB
Barium	85.8	3.00	ug/L	SW6020	G		08/13/09	08/19/09	NRB
Cadmium	ND	2.00	ug/L	SW6020	G		08/13/09	08/19/09	NRB
Chromium	ND	4.00	ug/L	SW6020	G		08/13/09	08/19/09	NRB
Lead	ND	1.00	ug/L	SW6020	G		08/13/09	08/19/09	NRB
Selenium	ND	2.00	ug/L	SW6020	G		08/13/09	08/19/09	NRB
Silver	ND	2.00	ug/L	SW6020	G		08/13/09	08/19/09	NRB
<u>Waters Department</u>									
TPH Silica Gel HEM	ND	4.30	mg/L	EPA 1664A	L		08/20/09	08/20/09	RTS
<u>Volatile Fuels Department</u>									
Gasoline Range Organics	ND	100	ug/L	AK101	D		08/13/09	08/13/09	KPW
<u>Surrogates</u>									
4-Bromofluorobenzene <surr>	123		%	AK101	D	50-150	08/13/09	08/13/09	KPW
<u>Semivolatile Organic Fuels Department</u>									
Diesel Range Organics	ND	860	ug/L	AK102	J		08/10/09	08/10/09	KDC
Residual Range Organics	ND	538	ug/L	AK103	J		08/10/09	08/10/09	KDC



SGS Ref.# 1094060004
Client Name Michael Baker Jr., Inc.
Project Name/# ASDP WQ
Client Sample ID L9341
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 08/26/2009 7:38
Collected Date/Time 08/04/2009 13:00
Received Date/Time 08/07/2009 13:45
Technical Director Stephen C. Ede

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
<u>Semivolatile Organic Fuels Department</u>									
Surrogates									
5a Androstane <surrogate>	73.4		%	AK102	J	50-150	08/10/09	08/10/09	KDC
n-Triacontane-d62 <surrogate>	81		%	AK103	J	50-150	08/10/09	08/10/09	KDC
<u>Volatile Gas Chromatography/Mass Spectroscopy</u>									
Benzene	ND	0.400	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Toluene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Ethylbenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
n-Butylbenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Carbon disulfide	ND	2.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
1,4-Dichlorobenzene	ND	0.500	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
1,2-Dichloroethane	ND	0.500	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
1,3,5-Trimethylbenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
4-Chlorotoluene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Chlorobenzene	ND	0.500	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
4-Methyl-2-pentanone (MIBK)	ND	10.0	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
cis-1,2-Dichloroethene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
4-Isopropyltoluene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
cis-1,3-Dichloropropene	ND	0.500	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
n-Propylbenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Styrene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Dibromomethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
trans-1,3-Dichloropropene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
1,2,4-Trichlorobenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
1,1,2,2-Tetrachloroethane	ND	0.500	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
1,2-Dibromo-3-chloropropane	ND	2.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Methyl-t-butyl ether	ND	5.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Tetrachloroethene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Dibromochloromethane	ND	0.500	ug/L	SW8260B	B		08/13/09	08/14/09	SCL



SGS Ref.# 1094060004
Client Name Michael Baker Jr., Inc.
Project Name/# ASDP WQ
Client Sample ID L9341
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 08/26/2009 7:38
Collected Date/Time 08/04/2009 13:00
Received Date/Time 08/07/2009 13:45
Technical Director Stephen C. Ede

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
<u>Volatile Gas Chromatography/Mass Spectroscopy</u>									
1,3-Dichloropropane	ND	0.400	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
1,2-Dibromoethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Carbon tetrachloride	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
1,1,1,2-Tetrachloroethane	ND	0.500	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Chloroform	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Bromobenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
1,2,3-Trichloropropane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Chloromethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Bromomethane	ND	3.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Bromochloromethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Vinyl chloride	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Dichlorodifluoromethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Chloroethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
sec-Butylbenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Bromodichloromethane	ND	0.500	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
1,1-Dichloroethene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
2-Butanone (MEK)	ND	10.0	ug/L	SW8260B	C		08/14/09	08/15/09	SCL
Methylene chloride	ND	5.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Trichlorofluoromethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
P & M -Xylene	ND	2.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Naphthalene	ND	2.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
o-Xylene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Bromoform	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Xylenes (total)	ND	2.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
1,2,4-Trimethylbenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
tert-Butylbenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
1,1,1-Trichloroethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
1,1-Dichloroethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
2-Chlorotoluene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Trichloroethene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL



SGS Ref.# 1094060004
Client Name Michael Baker Jr., Inc.
Project Name/# ASDP WQ
Client Sample ID L9341
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 08/26/2009 7:38
Collected Date/Time 08/04/2009 13:00
Received Date/Time 08/07/2009 13:45
Technical Director Stephen C. Ede

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
<u>Volatile Gas Chromatography/Mass Spectroscopy</u>									
trans-1,2-Dichloroethene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
1,2-Dichlorobenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
2,2-Dichloropropane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Hexachlorobutadiene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
Isopropylbenzene (Cumene)	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
2-Hexanone	ND	10.0	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
1,2-Dichloropropane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
1,1-Dichloropropene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
1,1,2-Trichloroethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
1,3-Dichlorobenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
1,2,3-Trichlorobenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/14/09	SCL
<u>Surrogates</u>									
1,2-Dichloroethane-D4 <surr>	107		%	SW8260B	B	73-120	08/13/09	08/14/09	SCL
Toluene-d8 <surr>	98.4		%	SW8260B	B	80-120	08/13/09	08/14/09	SCL
4-Bromofluorobenzene <surr>	101		%	SW8260B	B	76-120	08/13/09	08/14/09	SCL
<u>Polynuclear Aromatics GC/MS</u>									
Acenaphthylene	ND	0.0543	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Acenaphthene	ND	0.0543	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Fluorene	ND	0.0543	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Phenanthrene	ND	0.0543	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Anthracene	ND	0.0543	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Fluoranthene	ND	0.0543	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Pyrene	ND	0.0543	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Benzo(a)Anthracene	ND	0.0543	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Chrysene	ND	0.0543	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Benzo[b]Fluoranthene	ND	0.0543	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Benzo[k]fluoranthene	ND	0.0543	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Benzo[a]pyrene	ND	0.0543	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH



SGS Ref.# 1094060004
Client Name Michael Baker Jr., Inc.
Project Name/# ASDP WQ
Client Sample ID L9341
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 08/26/2009 7:38
Collected Date/Time 08/04/2009 13:00
Received Date/Time 08/07/2009 13:45
Technical Director Stephen C. Ede

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Polynuclear Aromatics GC/MS									
Indeno[1,2,3-c,d] pyrene	ND	0.0543	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Dibenzo[a,h]anthracene	ND	0.0543	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Benzo[g,h,i]perylene	ND	0.0543	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Naphthalene	ND	0.109	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
1-Methylnaphthalene	ND	0.0543	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
2-Methylnaphthalene	ND	0.0543	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Surrogates									
Terphenyl-d14 <surr>	74.7		%	8270D SIMS	H	50-135	08/08/09	08/17/09	JDH



SGS Ref.# 1094060005
Client Name Michael Baker Jr., Inc.
Project Name/# ASDP WQ
Client Sample ID M03S3
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 08/26/2009 7:38
Collected Date/Time 08/04/2009 10:55
Received Date/Time 08/07/2009 13:45
Technical Director Stephen C. Ede

Sample Remarks:

8260B - 1,2-dichloroethane-d4 (surrogate) recovery does not meet QC criteria (biased high). All target analytes associated with this surrogate were not detected above the POL.

1664 TPH - Due to lab error the sample was analyzed at a temperature in excess of 6 degrees celcius. The acid preservation would have prevented significant degradation but the results may be biased low.

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
<u>Metals Department</u>									
Mercury	ND	0.200	ug/L	SW7470A/E245.1	G		08/19/09	08/19/09	KAR
<u>Metals by ICP/MS</u>									
Arsenic	ND	5.00	ug/L	SW6020	G		08/13/09	08/19/09	NRB
Barium	166	3.00	ug/L	SW6020	G		08/13/09	08/19/09	NRB
Cadmium	ND	2.00	ug/L	SW6020	G		08/13/09	08/19/09	NRB
Chromium	ND	4.00	ug/L	SW6020	G		08/13/09	08/19/09	NRB
Lead	ND	1.00	ug/L	SW6020	G		08/13/09	08/19/09	NRB
Selenium	ND	2.00	ug/L	SW6020	G		08/13/09	08/19/09	NRB
Silver	ND	2.00	ug/L	SW6020	G		08/13/09	08/19/09	NRB
<u>Waters Department</u>									
TPH Silica Gel HEM	ND	4.28	mg/L	EPA 1664A	L		08/20/09	08/20/09	RTS
<u>Volatile Fuels Department</u>									
Gasoline Range Organics	ND	100	ug/L	AK101	D		08/13/09	08/13/09	KPW
<u>Surrogates</u>									
4-Bromofluorobenzene <surr>	128		%	AK101	D	50-150	08/13/09	08/13/09	KPW
<u>Semivolatile Organic Fuels Department</u>									
Diesel Range Organics	ND	879	ug/L	AK102	J		08/10/09	08/10/09	KDC



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Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
<u>Semivolatile Organic Fuels Department</u>									
Residual Range Organics	ND	549	ug/L	AK103	J		08/10/09	08/10/09	KDC
Surrogates									
5a Androstane <surrogate>	74.2		%	AK102	J	50-150	08/10/09	08/10/09	KDC
n-Triacontane-d62 <surrogate>	82.8		%	AK103	J	50-150	08/10/09	08/10/09	KDC
<u>Volatile Gas Chromatography/Mass Spectroscopy</u>									
Benzene	ND	0.400	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Toluene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Ethylbenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
n-Butylbenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Carbon disulfide	ND	2.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,4-Dichlorobenzene	ND	0.500	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,2-Dichloroethane	ND	0.500	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,3,5-Trimethylbenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
4-Chlorotoluene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Chlorobenzene	ND	0.500	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
4-Methyl-2-pentanone (MIBK)	ND	10.0	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
cis-1,2-Dichloroethene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
4-Isopropyltoluene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
cis-1,3-Dichloropropene	ND	0.500	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
n-Propylbenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Styrene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Dibromomethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
trans-1,3-Dichloropropene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,2,4-Trichlorobenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,1,2,2-Tetrachloroethane	ND	0.500	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,2-Dibromo-3-chloropropane	ND	2.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Methyl-t-butyl ether	ND	5.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Tetrachloroethene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL



SGS Ref.# 1094060005
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Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
<u>Volatile Gas Chromatography/Mass Spectroscopy</u>									
Dibromochloromethane	ND	0.500	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,3-Dichloropropane	ND	0.400	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,2-Dibromoethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Carbon tetrachloride	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,1,1,2-Tetrachloroethane	ND	0.500	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Chloroform	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Bromobenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,2,3-Trichloropropane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Chloromethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Bromomethane	ND	3.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Bromochloromethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Vinyl chloride	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Dichlorodifluoromethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Chloroethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
sec-Butylbenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Bromodichloromethane	ND	0.500	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,1-Dichloroethene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
2-Butanone (MEK)	ND	10.0	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Methylene chloride	ND	5.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Trichlorofluoromethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
P & M -Xylene	ND	2.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Naphthalene	ND	2.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
o-Xylene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Bromoform	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Xylenes (total)	ND	2.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,2,4-Trimethylbenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
tert-Butylbenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,1,1-Trichloroethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,1-Dichloroethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
2-Chlorotoluene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL



SGS Ref.# 1094060005
Client Name Michael Baker Jr., Inc.
Project Name/# ASDP WQ
Client Sample ID M03S3
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 08/26/2009 7:38
Collected Date/Time 08/04/2009 10:55
Received Date/Time 08/07/2009 13:45
Technical Director Stephen C. Ede

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
<u>Volatile Gas Chromatography/Mass Spectroscopy</u>									
Trichloroethene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
trans-1,2-Dichloroethene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,2-Dichlorobenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
2,2-Dichloropropane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Hexachlorobutadiene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Isopropylbenzene (Cumene)	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
2-Hexanone	ND	10.0	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,2-Dichloropropane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,1-Dichloropropene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,1,2-Trichloroethane	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,3-Dichlorobenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
1,2,3-Trichlorobenzene	ND	1.00	ug/L	SW8260B	B		08/13/09	08/13/09	SCL
Surrogates									
1,2-Dichloroethane-D4 <surr>	121	!	%	SW8260B	B	73-120	08/13/09	08/13/09	SCL
Toluene-d8 <surr>	100		%	SW8260B	B	80-120	08/13/09	08/13/09	SCL
4-Bromofluorobenzene <surr>	104		%	SW8260B	B	76-120	08/13/09	08/13/09	SCL
<u>Polynuclear Aromatics GC/MS</u>									
Acenaphthylene	ND	0.0538	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Acenaphthene	ND	0.0538	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Fluorene	ND	0.0538	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Phenanthrene	ND	0.0538	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Anthracene	ND	0.0538	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Fluoranthene	ND	0.0538	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Pyrene	ND	0.0538	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Benzo(a)Anthracene	ND	0.0538	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Chrysene	ND	0.0538	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Benzo[b]Fluoranthene	ND	0.0538	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Benzo[k]fluoranthene	ND	0.0538	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH



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Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
Polynuclear Aromatics GC/MS									
Benzo[a]pyrene	ND	0.0538	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Indeno[1,2,3-c,d] pyrene	ND	0.0538	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Dibenzo[a,h]anthracene	ND	0.0538	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Benzo[g,h,i]perylene	ND	0.0538	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Naphthalene	ND	0.108	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
1-Methylnaphthalene	ND	0.0538	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
2-Methylnaphthalene	ND	0.0538	ug/L	8270D SIMS	H		08/08/09	08/17/09	JDH
Surrogates									
Terphenyl-d14 <surr>	77.3		%	8270D SIMS	H	50-135	08/08/09	08/17/09	JDH



SGS Ref.# 1094060006
Client Name Michael Baker Jr., Inc.
Project Name/# ASDP WQ
Client Sample ID Trip Blank
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 08/26/2009 7:38
Collected Date/Time 08/04/2009 0:00
Received Date/Time 08/07/2009 13:45
Technical Director Stephen C. Ede

Sample Remarks:

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
<u>Volatile Fuels Department</u>									
Gasoline Range Organics	ND	100	ug/L	AK101	B		08/12/09	08/12/09	KPW
<u>Surrogates</u>									
4-Bromofluorobenzene <surr>	123		%	AK101	B	50-150	08/12/09	08/12/09	KPW
<u>Volatile Gas Chromatography/Mass Spectroscopy</u>									
Benzene	ND	0.400	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Toluene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Ethylbenzene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
n-Butylbenzene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Carbon disulfide	ND	2.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
1,4-Dichlorobenzene	ND	0.500	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
1,2-Dichloroethane	ND	0.500	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
1,3,5-Trimethylbenzene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
4-Chlorotoluene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Chlorobenzene	ND	0.500	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
4-Methyl-2-pentanone (MIBK)	ND	10.0	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
cis-1,2-Dichloroethene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
4-Isopropyltoluene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
cis-1,3-Dichloropropene	ND	0.500	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
n-Propylbenzene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Styrene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Dibromomethane	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
trans-1,3-Dichloropropene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
1,2,4-Trichlorobenzene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
1,1,2,2-Tetrachloroethane	ND	0.500	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
1,2-Dibromo-3-chloropropane	ND	2.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL



SGS Ref.# 1094060006
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Project Name/# ASDP WQ
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Matrix Water (Surface, Eff., Ground)

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Technical Director Stephen C. Ede

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
<u>Volatile Gas Chromatography/Mass Spectroscopy</u>									
Methyl-t-butyl ether	ND	5.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Tetrachloroethene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Dibromochloromethane	ND	0.500	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
1,3-Dichloropropane	ND	0.400	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
1,2-Dibromoethane	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Carbon tetrachloride	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
1,1,1,2-Tetrachloroethane	ND	0.500	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Chloroform	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Bromobenzene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
1,2,3-Trichloropropane	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Chloromethane	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Bromomethane	ND	3.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Bromochloromethane	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Vinyl chloride	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Dichlorodifluoromethane	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Chloroethane	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
sec-Butylbenzene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Bromodichloromethane	ND	0.500	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
1,1-Dichloroethene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
2-Butanone (MEK)	ND	10.0	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Methylene chloride	ND	5.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Trichlorofluoromethane	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
P & M -Xylene	ND	2.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Naphthalene	ND	2.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
o-Xylene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Bromoform	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Xylenes (total)	ND	2.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
1,2,4-Trimethylbenzene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
tert-Butylbenzene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
1,1,1-Trichloroethane	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL



SGS Ref.# 1094060006
Client Name Michael Baker Jr., Inc.
Project Name/# ASDP WQ
Client Sample ID Trip Blank
Matrix Water (Surface, Eff., Ground)

Printed Date/Time 08/26/2009 7:38
Collected Date/Time 08/04/2009 0:00
Received Date/Time 08/07/2009 13:45
Technical Director Stephen C. Ede

Parameter	Results	PQL	Units	Method	Container ID	Allowable Limits	Prep Date	Analysis Date	Init
<u>Volatile Gas Chromatography/Mass Spectroscopy</u>									
1,1-Dichloroethane	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
2-Chlorotoluene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Trichloroethene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
trans-1,2-Dichloroethene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
1,2-Dichlorobenzene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
2,2-Dichloropropane	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Hexachlorobutadiene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Isopropylbenzene (Cumene)	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
2-Hexanone	ND	10.0	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
1,2-Dichloropropane	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
1,1-Dichloropropene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
1,1,2-Trichloroethane	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
1,3-Dichlorobenzene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
1,2,3-Trichlorobenzene	ND	1.00	ug/L	SW8260B	A		08/11/09	08/12/09	SCL
Surrogates									
1,2-Dichloroethane-D4 <surr>	120		%	SW8260B	A	73-120	08/11/09	08/12/09	SCL
Toluene-d8 <surr>	102		%	SW8260B	A	80-120	08/11/09	08/12/09	SCL
4-Bromofluorobenzene <surr>	104		%	SW8260B	A	76-120	08/11/09	08/12/09	SCL



SGS Environmental Services Inc. CHAIN OF CUSTODY RECORD

1094060

anyland ew York hio



1 CLIENT: MICHAEL BAKER JR

CONTACT: JULIE SHEWMAN PHONE NO:

PROJECT: ASDP WQ SITE/PWSID#: EMAIL: jshewman@mbakercorp.com

REPORTS TO: JULIE SHEWMAN

INVOICE TO: JULIE SHEWMAN QUOTE #: P.O. #:

SGS Reference #: SHORT 1 of 1

Preservatives Used Analysis Required (3)

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX/MATRIX CODE	# CONTAINERS	SAMPLE TYPE	Incremental Samples	MI= Multi	GRAB	PRO	RRO	AK102	AK103	RORA-8	SW 6020/1470	GRO	AK101	VOC	SW 8260B	TPH	EPA 1664	PAH	SW 8270D SIMS	REMARKS/LOC ID
L9323	① A-C	8/4/09	1645																					
L9324	② A	8/4/09	1800																					
M9313	③ A	8/5/09	1040																					
L9341	④ I-G-U, L, M	8/4/09	1300																					
M0353	⑤ G-I	8/4/09	1055																					

Special Deliverable Requirements: please list all RORA & metals

DOD Project? YES NO Cooler ID

Requested Turnaround Time and/or Special Instructions:

Samples Received Cold? YES NO Cooler Temperature °C: # 7 6.8

Chain of Custody Seal: (Circle) INTACT BROKEN ABSENT



SGS Environmental Services Inc. CHAIN OF CUSTODY RECORD

1094060



iwide Maryland New York Ohio

gs.com

1 CLIENT: MICHAEL BAKER JR
 CONTACT: JULIE SHEWMAN PHONE NO:
 PROJECT: ASDP WQ SITE/PWSID#:
 REPORTS TO: JULIE SHEWMAN EMAIL: jshewman@mbaker Corp. com
 INVOICE TO: JULIE SHEWMAN QUOTE #:
 P.O. #:

SGS Reference #:

# CONTAINERS	SAMPLE TYPE C= COMP G= GRAB M= Multi Incremental Samples	Preservatives Used	Analysts Required	REMARKS/LOC ID				
				DRD AK102	PRO AK103	RCA-8 SW6020/7470	GRO AK101	VOC SW8260B
1	X		3	X	X	X	X	
1	X		3	X	X	X	X	
1	X							
1	X							

2

LAB NO.	SAMPLE IDENTIFICATION	DATE	TIME	MATRIX MATRIX CODE
⑤ A-F, J-M MD353	8/4/09	11:00		
⑥ A-F, K L9341	8/4/09	13:00		
③ B-C M9313	8/5/09	10:40		
② B-C L9324	8/4/09	18:00		

4

DOD Project?	YES	NO	Special Deliverable Requirements: Please list all RCRA metals

Requested Turnaround Time and/or Special Instructions:

5

Collected/Relinquished By: (1)	Date	Time	Received By:
JULIE SHEWMAN	8/7/09	8:25am	
Relinquished By: (2)	Date	Time	Received By:
Relinquished By: (3)	Date	Time	Received By:
Relinquished By: (4)	Date	Time	Received For Laboratory By:

Chain of Custody Seal: (Circle)

INTACT BROKEN ABSENT

Samples Received Cold? YES NO
 #7 Cooler TB
 Temperature °C: 6.7



SAMPLE RECEIPT FORM

SGS WO#:

Yes No NA

- Are samples **RUSH**, priority or w/in 72 hrs of **hold time**?
- If yes, have you done e-mail **ALERT** notification?
- Are samples **within 24 hrs.** of **hold time** or **due date**?
- If yes, have you also **spoken with supervisor**?
- Archiving bottles: Are lids marked w/ red "X"?
- Were samples collected with proper preservative?
- Any problems (ID, cond'n, HT, etc)? Explain:**

TAT (circle one): Standard -or- Rush

Received Date: 8-7-09

Received Time: 1345

Cooler ID	Temperature	Measured w/ (Therm/IR ID#)
<u>1</u>	<u>6.8</u> °C	<u>#7</u>
<u>2</u>	<u>6.7</u> °C	<u>#7</u>
	°C	
	°C	

Note: Temperature readings include thermometer correction factors

Delivery method (circle all that apply):

- Client / Alert Courier / Lynden / SGS
- UPS / FedEx / USPS / DHL / Carlisle
- AkAir Goldstreak / NAC / ERA / PenAir
- Other: _____

Additional Sample Remarks: (✓ if applicable)

- Extra Sample Volume?
- Limited Sample Volume?
- Multi-Incremental Samples?
- Lab-filtered for dissolved
- Ref Lab required for
- Foreign Soil?

- If this is for PWS, provide PWSID: _____
- Payment received: \$ _____ by Check or Credit Card
- Will courier charges apply?
- Data package required? (Level: 1 / 2 / 3 / 4)
- Notes: _____
- Is this a DoD project? (USACE, Navy, AFCEE)

This section must be filled out for DoD projects (USACE, Navy, AFCEE):

Yes	No	
<input type="checkbox"/>	<input type="checkbox"/>	Is received temperature $\leq 6^{\circ}\text{C}$?
<input type="checkbox"/>	<input type="checkbox"/>	Were containers ice-free? <i>Notify PM immediately of any ice in samples.</i>
<input type="checkbox"/>	<input type="checkbox"/>	If some cooler temperatures are non-compliant, see form FS-0029 (attached) for samples/analyses affected.
<input type="checkbox"/>	<input type="checkbox"/>	Was there an airbill? (If 'yes,' see attached.)
<input type="checkbox"/>	<input type="checkbox"/>	Was cooler sealed with custody seals & were they intact? # / where: _____
<input type="checkbox"/>	<input type="checkbox"/>	Was there a COC with cooler?
<input type="checkbox"/>	<input type="checkbox"/>	Was COC sealed in plastic bag & taped inside lid of cooler?
<input type="checkbox"/>	<input type="checkbox"/>	Was the COC filled out properly? Did labels correspond?
<input type="checkbox"/>	<input type="checkbox"/>	Did the COC indicate USACE / Navy / AFCEE project?
<input type="checkbox"/>	<input type="checkbox"/>	Samples were packed to prevent breakage with (circle one): Bubble Wrap / Vermiculite / Other (specify): _____
<input type="checkbox"/>	<input type="checkbox"/>	Were all samples sealed in separate plastic bags?
<input type="checkbox"/>	<input type="checkbox"/>	Were all VOCs free of headspace and/or MeOH preserved?
<input type="checkbox"/>	<input type="checkbox"/>	Were correct container / sample sizes submitted?
<input type="checkbox"/>	<input type="checkbox"/>	Was the PM notified of arrival so they can send Sample Receipt Acknowledgement to client?

This section must be completed if problems are noted.

Was client notified of problems? Yes / No

By (SGS PM): _____

Individual contacted: _____

Via: Phone / Fax / E-mail (circle one): _____

Date/Time: _____

Reason for contact: _____

Change Order Required? Yes / No

Notes:

Completed by (sign): [Signature] (print): JAMES DOUGHTY

Login proof: Self-check completed [Signature] Peer-reviewer's Initials JJR



#	Container ID	Matrix	Test	Container Volume						Container Type							Preservative																		
				QC	TB	1 L	500 mL	250 mL or 8oz	125 mL or 4oz	60 mL	40 mL	Other (specify)	AG	CG	HDPE	Nalgene	Coli	Septa	Other (specify)	None	HCl	HNO ₃	H ₂ SO ₄	MeOH	Na ₂ S ₂ O ₃	NaOH	NaOH+ZnAc	Other (specify)	* Notes						
1-3	A	1	RCMA 8 METALS			3						✓							None	✓															
	B,C		DRG RMO			6														✓															
4,5	A-C	1	VOC						6											✓															
	D-F		GAO						6											✓															
	G		RCMA 8 METALS							2										✓															
	H,I		PAH							4										✓															
	J,K		DRG RMO							4										✓															
	L,M		TPH							4										✓															
6	A-C	1	VOC										3							✓															
	D-F		GAO										3							✓															
				Bottle Totals	18	5	6	5	6	3	3	3	3																						

* Note: Containers which require (additional) chemical preservation upon receipt must be documented per SOP#106.

Completed by: *[Signature]* Date: 8.7.09

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Appendix B 2008 DATA

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AUGUST 27, 2008 ON-SITE AND LABORATORY WATER QUALITY RESULT SUMMARIES

Location Time	Depth (ft)	Turbidity NTU	Depth (ft)	Temp (°C)	Conductivity (µS/cm)	Specific Conductance (µS/cm)	DO (mg/L)	DO (Percent Saturation)	Salinity (ppt)
M9313 11:10 a.m.	26.0	0.65	Surface	7.7	540	807	-	-	0.4
			2.0	7.7	540	806	11.87	100.4	0.4
			4.0	7.7	540	806	11.85	100.3	0.4
			6.0	7.7	540	806	11.84	100.3	0.4
			8.0	7.7	540	806	11.84	100.2	0.4
			10.0	7.7	540	806	11.83	100.1	0.4
			12.0	7.7	540	806	11.81	100.0	0.4
			14.0	7.7	540	806	11.81	100.0	0.4
			16.0	7.7	540	806	11.77	99.7	0.4
			18.0	7.7	540	806	11.75	99.5	0.4
			20.0	7.7	540	806	11.74	99.4	0.4
			22.0	7.7	540	806	11.71	99.2	0.4
24.0	7.7	539	805	11.65	98.7	0.4			
26.0	7.7	533	797	-	-	0.4			
L9323 3:50 p.m.	19.8	1.96	Surface	8.4	79.3	116.2	12.01	103.3	0.1
			2.0	8.4	79.3	116.2	12.00	103.2	0.1
			4.0	8.4	79.3	116.2	11.98	103.1	0.1
			6.0	8.3	79.3	116.2	11.99	103.1	0.1
			8.0	8.3	79.3	116.2	11.96	102.9	0.1
			10.0	8.3	79.3	116.2	11.95	102.8	0.1
			12.0	8.3	79.3	116.2	11.94	102.7	0.1
			14.0	8.3	79.3	116.2	11.92	102.5	0.1
			16.0	8.3	79.1	115.8	11.88	102.3	0.1
			18.0	8.3	78.4	115.0	11.79	101.6	0.1
19.0	8.3	78.3	114.8	11.78	101.5	0.1			
L9324 4:50 p.m.	9.7	3.40	Surface	8.4	53.1	77.8	12.09	103.9	0.0
			2.0	8.4	53.1	77.8	12.09	103.9	0.0
			4.0	8.4	53.1	77.8	12.08	103.8	0.0
			6.0	8.4	53.1	77.8	12.07	103.7	0.0
			8.0	8.4	53.1	77.8	12.04	103.4	0.0
			9.0	8.4	53.1	77.8	12.03	103.3	0.0

Notes:
(1) Sample depth is measured from the water surface.
(2) Turbidity was measured using a Hach-2100P Turbidometer
(3) Salinity, conductivity, specific conductance, and temperature were measured using a YSI-30 meter
(4) Dissolved oxygen measurements were obtained using a Hach HQ40d LDO meter

Lake M9313

Lab Sample Number	Test Method	Analysis	Concentration	Units	PQL	MDL	SS Recovery (%)	LCL	UCL
A0809003-03C	SW6010B-ICP-RCRA	Mercury	ND	mg/L	0.00020	0.000050	-	-	-
A0809003-03B	ADEC AK103-RRO	Residual Range Organics <i>Squalane</i>	ND 0.054	mg/L mg/L	0.52 0.0052	0.21 0.0021	- 104	- 50	- 150
A0809003-03A	ADEC AK102-DRO	Diesel Range Organics <i>o-Terphenyl</i>	ND 0.04	mg/L mg/L	0.10 0.00069	0.0062 0.0038	- 76.2	- 50	- 120
A0809003-03C	SW6010B-ICP-RCRA	Arsenic	ND	mg/L	0.10	0.015	-	-	-
		Barium	0.23	mg/L	0.010	0.00016	-	-	-
		Cadmium	ND	mg/L	0.0060	0.00051	-	-	-
		Chromium	ND	mg/L	0.010	0.0018	-	-	-
		Lead	ND	mg/L	0.050	0.011	-	-	-
		Selenium	ND	mg/L	0.10	0.026	-	-	-
		Silver	ND	mg/L	0.015	0.00066	-	-	-

Notes:
(1) PQL: Practical Quantification Limit
(2) MDL: Method Detection Limit
(3) SS Recovery: Spiked Sample Recovery (% of original)
(4) LCL: Lower Confidence Limit
(5) UCL: Upper Confidence Limit
(6) *Surrogates* are italicized

Lake L9323

Lab Sample Number	Test Method	Analysis	Concentration	Units	PQL	MDL	SS Recovery (%)	LCL	UCL
A0809003-01C	SW6010B-ICP-RCRA	Mercury	ND	mg/L	0.00020	0.00050	-	-	-
A0809003-01B	ADEC AK103-RRO	Residual Range Organics <i>Squalane</i>	ND 0.051	mg/L mg/L	0.52 0.0052	0.21 0.0021	- 98.7	- 50	- 150
A0809003-01A	ADEC AK102-DRO	Diesel Range Organics <i>o-Terphenyl</i>	ND 0.040	mg/L mg/L	0.10 0.00069	0.0062 0.0038	- 77.0	- 50	- 120
A0809003-01C	SW6010B-ICP-RCRA	Arsenic	ND	mg/L	0.10	0.015	-	-	-
		Barium	0.050	mg/L	0.010	0.00016	-	-	-
		Cadmium	ND	mg/L	0.0060	0.00051	-	-	-
		Chromium	ND	mg/L	0.010	0.0018	-	-	-
		Lead	ND	mg/L	0.050	0.011	-	-	-
		Selenium	ND	mg/L	0.10	0.026	-	-	-
		Silver	ND	mg/L	0.015	0.00066	-	-	-

Notes:
(1) PQL: Practical Quantification Limit
(2) MDL: Method Detection Limit
(3) SS Recovery: Spiked Sample Recovery (% of original)
(4) LCL: Lower Confidence Limit
(5) UCL: Upper Confidence Limit
(6) *Surrogates* are italicized

Lake L9324

Lab Sample Number	Test Method	Analysis	Concentration	Units	PQL	MDL	SS Recovery (%)	LCL	UCL
A0809003-02C	SW6010B-ICP-RCRA	Mercury	ND	mg/L	0.00020	0.000050	-	-	-
A0809003-02B	ADEC AK103-RRO	Residual Range Organics	ND	mg/L	0.52	0.21	-	-	-
		<i>Squalane</i>	0.054	mg/L	0.0052	0.0021	103	50	150
A0809003-02A	ADEC AK102-DRO	Diesel Range Organics	ND	mg/L	0.10	0.0062	-	-	-
		<i>o-Terphenyl</i>	0.043	mg/L	0.00069	0.0038	81.7	50	120
A0809003-02C	SW6010B-ICP-RCRA	Arsenic	ND	mg/L	0.10	0.015	-	-	-
		Barium	0.047	mg/L	0.010	0.00016	-	-	-
		Cadmium	ND	mg/L	0.0060	0.00051	-	-	-
		Chromium	ND	mg/L	0.010	0.0018	-	-	-
		Lead	ND	mg/L	0.050	0.011	-	-	-
		Selenium	ND	mg/L	0.10	0.026	-	-	-
		Silver	ND	mg/L	0.015	0.00066	-	-	-

Notes:

- (1) PQL: Practical Quantification Limit
- (2) MDL: Method Detection Limit
- (3) SS Recovery: Spiked Sample Recovery (% of original)
- (4) LCL: Lower Confidence Limit
- (5) UCL: Upper Confidence Limit
- (6) *Surrogates* are italicized



SP-Analytica, Inc.-Anchorage
4307 Arctic Blvd.
Anchorage, AK 99503
Phone: 907-258-2155
Fax: 907-258-6634

9/12/2008

Michael Baker Jr Inc
1400 W. Benson Blvd. Ste 200
STE 200
Anchorage, AK 99503
Attn: Ozzy Orwick

Work Order #: A0809003
Date: 9/12/2008
Work ID: Lake Sampling
Date Received: 8/28/2008
Proj #: Lake Sampling

Sample Identification

Lab Sample Number	Client Description	Lab Sample Number	Client Description
A0809003-01	Lake L9323	A0809003-02	Lake L9324
A0809003-03	Lake M9313		

Enclosed are the analytical results for the submitted sample(s). Please review the CASE NARRATIVE for a discussion of any data and/or quality control issues. Listings of data qualifiers, analytical codes, key dates, and QC relationships are provided at the end of the report.

Sincerely,

Kristen Stone
Project Manager

"The Science of Analysis, The Art of Service"

Case Narrative

Analytica Alaska Inc.
Work Order: A0809003

Samples were prepared and analyzed according to EPA or equivalent methods outlined in the following references:

Test Methods for Evaluating Solid Waste, USEPA SW-846, Third Edition, Revision 4, December 1996.

Method AK102 For the Determination of Diesel Range Organics, Revision 3.0, 01/31/96.

Method AK103 For the Determination of Residual Range Organics, Revision 2.0, 01/31/96.

SAMPLE RECEIPT:

Three (3) samples were received on 8/28/2008 9:45:00 AM at a temperature of 3.5°C at Analytica-Anchorage. The samples were received in good condition and in order per chain of custody.

Comments:

The samples were transferred for analysis at Analytica Environmental Laboratories (AEL); 12189 Pennsylvania St. Thornton, CO 80241 where they were received at a temperature of 5.7°C in good condition and in order per chain of custody.

REVIEW FOR COMPLIANCE WITH ANALYTICA QA PLAN

A summary of our review is shown below.

All analytical results contained in this report have been reviewed under Analytica's internal quality assurance and quality control program. Any deviations in quality control parameters for specific analyses are noted in the following text. A complete quality assurance report, including laboratory control, matrix spike, and sample duplicate recoveries is kept on file in our office and is available upon request.

All method specifications were met for the following tests:

Test Method: ADEC AK102 - DRO - Aqueous

Test Method: ADEC AK103 - RRO - Aqueous

Test Method: SW6010B - ICP - RCRA - Aqueous

Test Method: SW7470A - Mercury in Liquid Waste by CVAA - Total Hg - Aqueous

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): A0809003

Project: Lake Sampling
Client: Michael Baker Jr Inc

Client Project Number: Lake Sampling

Report Section: Client Sample Report

Client Sample Name: Lake L9323

Matrix: Aqueous Collection Date: 8/27/2008 4:00:00PM

The following test was conducted by: Analytica - Thornton

Lab Sample Number: A0809003-01B Analysis Date: 9/9/2008 4:20:50AM
Prep Date: 9/3/2008 Instrument: GC_E
Analytical Method ID: ADEC AK103 - RRO File Name: 08090821.D
Prep Method ID: 3510C Dilution Factor: 1
Prep Batch Number: T080903015
Report Basis: As Received Analyst Initials: R.S
Sample prep wt./vol: 970.00 ml Prep Extract Vol: 1.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>run #:</u>			
Residual Range Organics	n/a	ND		mg/L	0.52	0.21		1			
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>run #:</u>
Squalane	111-01-3	0.051		mg/L	0.0052	0.0021	0.052	98.7	50	150	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: A0809003-01A Analysis Date: 9/8/2008 9:02:21PM
Prep Date: 9/8/2008 Instrument: GC_E
Analytical Method ID: ADEC AK102 - DRO File Name: 08090812.D
Prep Method ID: 3510C Dilution Factor: 1
Prep Batch Number: T080903014
Report Basis: As Received Analyst Initials: R.S
Sample prep wt./vol: 970.00 ml Prep Extract Vol: 1.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>run #:</u>			
Diesel Range Organics	n/a	ND		mg/L	0.10	0.0062		1			
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>run #:</u>
o-Terphenyl	84-15-1	0.040		mg/L	0.00069	0.0038	0.052	77.0	50	120	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: A0809003-01C Analysis Date: 9/10/2008 12:15:00PM
Prep Date: 9/8/2008 Instrument: ICP_2
Analytical Method ID: SW6010B - ICP - RCRA File Name: E09108A
Prep Method ID: 3010A Dilution Factor: 1
Prep Batch Number: T080908012
Report Basis: As Received Analyst Initials: rm
Sample prep wt./vol: 50.00 ml Prep Extract Vol: 50.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>		<u>run #:</u>
Arsenic	7440-38-2	ND		mg/L	0.10	0.015		1
Barium	7440-39-3	0.050		mg/L	0.010	0.00016		
Cadmium	7440-43-9	ND		mg/L	0.0060	0.00051		
Chromium	7440-47-3	ND		mg/L	0.010	0.0018		
Lead	7439-92-1	ND		mg/L	0.050	0.011		
Selenium	7784-49-2	ND		mg/L	0.10	0.026		
Silver	7440-22-4	ND		mg/L	0.015	0.00066		

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): A0809003

Project: Lake Sampling

Client: Michael Baker Jr Inc

Client Project Number: Lake Sampling

Report Section: Client Sample Report

Client Sample Name: Lake L9323

Matrix: Aqueous

Collection Date: 8/27/2008 4:00:00PM

The following test was conducted by: Analytica - Thornton

Lab Sample Number: A0809003-01C

Analysis Date: 9/11/2008 2:16:36PM

Prep Date: 9/9/2008

Instrument: CVAA_1

Analytical Method ID: SW7470A - Mercury in Liquid Waste by CVAA - Total Hg

File Name: B090908W.W

Prep Method ID: 7470A

Dilution Factor: 1

Prep Batch Number: T080909006

Report Basis: As Received

Analyst Initials: DL

Sample prep wt./vol: 30.00 ml

Prep Extract Vol: 30.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>run #:</u>
Mercury	7439-97-6	ND		mg/L	0.00020	0.000050	1

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): A0809003

Project: Lake Sampling
Client: Michael Baker Jr Inc

Client Project Number: Lake Sampling

Report Section: Client Sample Report

Client Sample Name: Lake L9324

Matrix: Aqueous Collection Date: 8/27/2008 5:00:00PM

The following test was conducted by: Analytica - Thornton

Lab Sample Number: A0809003-02B Analysis Date: 9/9/2008 5:09:27AM
Prep Date: 9/3/2008 Instrument: GC_E
Analytical Method ID: ADEC AK103 - RRO File Name: 08090822.D
Prep Method ID: 3510C Dilution Factor: 1
Prep Batch Number: T080903015
Report Basis: As Received Analyst Initials: R.S
Sample prep wt./vol: 960.00 ml Prep Extract Vol: 1.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>run #:</u>	
Residual Range Organics	n/a	ND		mg/L	0.52	0.21				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>run #:</u>
Squalane	111-01-3	0.054		mg/L	0.0052	0.0021	0.052	103	50	150	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: A0809003-02A Analysis Date: 9/8/2008 9:51:04PM
Prep Date: 9/8/2008 Instrument: GC_E
Analytical Method ID: ADEC AK102 - DRO File Name: 08090813.D
Prep Method ID: 3510C Dilution Factor: 1
Prep Batch Number: T080903014
Report Basis: As Received Analyst Initials: R.S
Sample prep wt./vol: 960.00 ml Prep Extract Vol: 1.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>run #:</u>	
Diesel Range Organics	n/a	ND		mg/L	0.10	0.0062				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>run #:</u>
o-Terphenyl	84-15-1	0.043		mg/L	0.00069	0.0038	0.052	81.7	50	120	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: A0809003-02C Analysis Date: 9/10/2008 12:45:00PM
Prep Date: 9/8/2008 Instrument: ICP_2
Analytical Method ID: SW6010B - ICP - RCRA File Name: E09108A
Prep Method ID: 3010A Dilution Factor: 1
Prep Batch Number: T080908012
Report Basis: As Received Analyst Initials: rm
Sample prep wt./vol: 50.00 ml Prep Extract Vol: 50.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>run #:</u>
Arsenic	7440-38-2	ND		mg/L	0.10	0.015				1
Barium	7440-39-3	0.047		mg/L	0.010	0.00016				
Cadmium	7440-43-9	ND		mg/L	0.0060	0.00051				
Chromium	7440-47-3	ND		mg/L	0.010	0.0018				
Lead	7439-92-1	ND		mg/L	0.050	0.011				
Selenium	7784-49-2	ND		mg/L	0.10	0.026				
Silver	7440-22-4	ND		mg/L	0.015	0.00066				

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): A0809003

Project: Lake Sampling

Client: Michael Baker Jr Inc

Client Project Number: Lake Sampling

Report Section: Client Sample Report

Client Sample Name: Lake L9324

Matrix: Aqueous

Collection Date: 8/27/2008 5:00:00PM

The following test was conducted by: Analytica - Thornton

Lab Sample Number: A0809003-02C

Analysis Date: 9/11/2008 2:18:50PM

Prep Date: 9/9/2008

Instrument: CVAA_1

Analytical Method ID: SW7470A - Mercury in Liquid Waste by CVAA - Total Hg

File Name: B090908W.W

Prep Method ID: 7470A

Dilution Factor: 1

Prep Batch Number: T080909006

Report Basis: As Received

Analyst Initials: DL

Sample prep wt./vol: 30.00 ml

Prep Extract Vol: 30.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>run #:</u>
Mercury	7439-97-6	ND		mg/L	0.00020	0.000050	1

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): A0809003

Project: Lake Sampling
Client: Michael Baker Jr Inc

Client Project Number: Lake Sampling

Report Section: Client Sample Report

Client Sample Name: Lake M9313

Matrix: Aqueous Collection Date: 8/27/2008 11:45:00AM

The following test was conducted by: Analytica - Thornton

Lab Sample Number: A0809003-03B Analysis Date: 9/9/2008 5:58:14AM
Prep Date: 9/3/2008 Instrument: GC_E
Analytical Method ID: ADEC AK103 - RRO File Name: 08090823.D
Prep Method ID: 3510C Dilution Factor: 1
Prep Batch Number: T080903015
Report Basis: As Received Analyst Initials: R.S
Sample prep wt./vol: 960.00 ml Prep Extract Vol: 1.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>run #:</u>	
Residual Range Organics	n/a	ND		mg/L	0.52	0.21				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>run #:</u>
Squalane	111-01-3	0.054		mg/L	0.0052	0.0021	0.052	104	50	150	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: A0809003-03A Analysis Date: 9/8/2008 10:39:34PM
Prep Date: 9/8/2008 Instrument: GC_E
Analytical Method ID: ADEC AK102 - DRO File Name: 08090814.D
Prep Method ID: 3510C Dilution Factor: 1
Prep Batch Number: T080903014
Report Basis: As Received Analyst Initials: R.S
Sample prep wt./vol: 960.00 ml Prep Extract Vol: 1.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>run #:</u>	
Diesel Range Organics	n/a	ND		mg/L	0.10	0.0062				1	
<u>Surrogate</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>Spike</u>	<u>% Recov</u>	<u>LCL</u>	<u>UCL</u>	<u>run #:</u>
o-Terphenyl	84-15-1	0.040		mg/L	0.00069	0.0038	0.052	76.2	50	120	1

The following test was conducted by: Analytica - Thornton

Lab Sample Number: A0809003-03C Analysis Date: 9/10/2008 12:50:00PM
Prep Date: 9/8/2008 Instrument: ICP_2
Analytical Method ID: SW6010B - ICP - RCRA File Name: E09108A
Prep Method ID: 3010A Dilution Factor: 1
Prep Batch Number: T080908012
Report Basis: As Received Analyst Initials: rm
Sample prep wt./vol: 50.00 ml Prep Extract Vol: 50.00 ml

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>				<u>run #:</u>
Arsenic	7440-38-2	ND		mg/L	0.10	0.015				1
Barium	7440-39-3	0.23		mg/L	0.010	0.00016				
Cadmium	7440-43-9	ND		mg/L	0.0060	0.00051				
Chromium	7440-47-3	ND		mg/L	0.010	0.0018				
Lead	7439-92-1	ND		mg/L	0.050	0.011				
Selenium	7784-49-2	ND		mg/L	0.10	0.026				
Silver	7440-22-4	ND		mg/L	0.015	0.00066				

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): A0809003

Project: Lake Sampling

Client: Michael Baker Jr Inc

Client Project Number: Lake Sampling

Report Section: Client Sample Report

Client Sample Name: **Lake M9313**

Matrix: Aqueous Collection Date: 8/27/2008 11:45:00AM

The following test was conducted by: Analytica - Thornton

Lab Sample Number:	A0809003-03C	Analysis Date:	9/11/2008 2:21:10PM
Prep Date:	9/9/2008	Instrument:	CVAA_1
Analytical Method ID:	SW7470A - Mercury in Liquid Waste by CVAA - Total Hg	File Name:	B090908W.W
Prep Method ID:	7470A	Dilution Factor:	1
Prep Batch Number:	T080909006	Analyst Initials:	DL
Report Basis:	As Received	Prep Extract Vol:	30.00 ml
Sample prep wt./vol:	30.00 ml		

<u>Analyte</u>	<u>CASNo</u>	<u>Result</u>	<u>Flags</u>	<u>Units</u>	<u>PQL</u>	<u>MDL</u>	<u>run #:</u>
Mercury	7439-97-6	ND		mg/L	0.00020	0.000050	1

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): A0809003

Project: Lake Sampling

Client: Michael Baker Jr Inc

Client Project Number: Lake Sampling

QC BATCH ASSOCIATIONS - BY METHOD BLANK

Lab Project ID: 91,767 Lab Project Number: A0809003

Prep Date: 9/8/2008

Lab Method Blank Id: T080903014-MB

Prep Batch ID: T080903014

Method: ADEC AK102 - DRO

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
T080903014-LCS	LCS	08090809.D	9/8/2008 6:35:45PM
T080903014-LCSD	LCSD	08090810.D	9/8/2008 7:24:46PM
A0809003-01A	Lake L9323	08090812.D	9/8/2008 9:02:21PM
A0809003-02A	Lake L9324	08090813.D	9/8/2008 9:51:04PM
A0809003-03A	Lake M9313	08090814.D	9/8/2008 10:39:34PM

Prep Date: 9/3/2008

Lab Method Blank Id: T080903015-MB

Prep Batch ID: T080903015

Method: ADEC AK103 - RRO

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
T080903015-LCS	LCS	08090819.D	9/9/2008 2:43:12AM
T080903015-LCSD	LCSD	08090820.D	9/9/2008 3:31:56AM
A0809003-01B	Lake L9323	08090821.D	9/9/2008 4:20:50AM
A0809003-02B	Lake L9324	08090822.D	9/9/2008 5:09:27AM
A0809003-03B	Lake M9313	08090823.D	9/9/2008 5:58:14AM

Prep Date: 9/8/2008

Lab Method Blank Id: T080908012-MB

Prep Batch ID: T080908012

Method: SW6010B - ICP - RCRA

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
A0809003-01C	Lake L9323	E09108A	9/10/2008 12:15:00PM
A0809003-02C	Lake L9324	E09108A	9/10/2008 12:45:00PM
A0809003-03C	Lake M9313	E09108A	9/10/2008 12:50:00PM
T080908012-LCS	LCS	E09108A	9/10/2008 12:05:00PM
T080908012-LCSD	LCSD	E09108A	9/10/2008 12:10:00PM
A0809003-01C-DUP	DUP	E09108A	9/10/2008 12:20:00PM
A0809003-01C-MS	MS	E09108A	9/10/2008 12:25:00PM
A0809003-01C-MSD	MSD	E09108A	9/10/2008 12:30:00PM
A0809003-01C-PDS	PDS	E09108A	9/10/2008 12:35:00PM

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): A0809003

Project: Lake Sampling

Client: Michael Baker Jr Inc

Client Project Number: Lake Sampling

QC BATCH ASSOCIATIONS - BY METHOD BLANK

Lab Project ID: 91,767 Lab Project Number: A0809003

Prep Date: 9/9/2008

Lab Method Blank Id: T080909006-MB

Prep Batch ID: T080909006

Method: SW7470A - Mercury in Liquid Waste by CVAA - Total Hg

This Method blank and sample preparation batch are associated with the following samples, spikes, and duplicates:

<u>SampleNum</u>	<u>ClientSampleName</u>	<u>DataFile</u>	<u>AnalysisDate</u>
A0809003-01C	Lake L9323	B090908W.WKS	9/11/2008 2:16:36PM
A0809003-02C	Lake L9324	B090908W.WKS	9/11/2008 2:18:50PM
A0809003-03C	Lake M9313	B090908W.WKS	9/11/2008 2:21:10PM
B0808203-02D	Batch QC	B090908W.WKS	9/11/2008 2:23:25PM
J0809022-01F	Batch QC	B090908W.WKS	9/11/2008 3:14:00PM
T080909006-LCS	LCS	B090908W.WKS	9/11/2008 2:07:39PM
T080909006-LCSD	LCSD	B090908W.WKS	9/11/2008 2:09:42PM
B0808203-02D-DUP	DUP	B090908W.WKS	9/11/2008 2:25:29PM
J0809022-01F-DUP	DUP	B090908W.WKS	9/11/2008 3:16:18PM
B0808203-02D-MS	MS	B090908W.WKS	9/11/2008 2:42:59PM
J0809022-01F-MS	MS	B090908W.WKS	9/11/2008 3:18:32PM
B0808203-02D-MSD	MSD	B090908W.WKS	9/11/2008 2:45:05PM
J0809022-01F-MSD	MSD	B090908W.WKS	9/11/2008 3:20:46PM
B0808203-02D-PDS	PDS	B090908W.WKS	9/11/2008 2:47:10PM
J0809022-01F-PDS	PDS	B090908W.WKS	9/11/2008 3:22:53PM

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): A0809003

Project: Lake Sampling

Client: Michael Baker Jr Inc

Client Project Number: Lake Sampling

DATA FLAGS AND DEFINITIONS

The PQL is the Method Quantitation Limit as defined by USACE.

Reporting Limit: Limit below which results are shown as "ND". This may be the PQL, MDL, or a value between. See the report conventions below.

Result Field:

ND = Not Detected at or above the Reporting Limit

NA = Analyte not applicable (see Case Narrative for discussion)

Qualifier Fields:

LOW = Recovery is below Lower Control Limit

HIGH = Recovery, RPD, or other parameter is above Upper Control Limit

E = Reported concentration is above the instrument calibration upper range

Organic Analysis Flags:

B = Analyte was detected in the laboratory method blank

J = Analyte was detected above MDL or Reporting Limit but below the Quant Limit (PQL)

Inorganic Analysis Flags:

J = Analyte was detected above the Reporting Limit but below the Quant Limit (PQL)

W = Post digestion spike did not meet criteria

S = Reported value determined by the Method of Standard Additions (MSA)

Several ways of defining the limit of detection and quantitation are prevalent in the laboratory industry and may appear in Analytica reports. These include the following:

MRL = "minimum reporting level", from the EPA Safe Drinking Water program (SDW)

PQL = "practical quantitation limit", from SW-846

EQL = "estimated quantitation limit", from SW-846

LOQ = "limit of quantitation", from a number of authoritative sources

In Analytica's work, all of these terms have the same meaning, equivalent to the EPA definition of the MRL. This reporting level is supported by a satisfactory calibration data point which is at that level or lower, and also is supported by a method detection limit (MDL) determined by the procedure in 40CFR. The MDL is lower than the MRL and represents an estimate of the level where positive detections have a 99% probability of being real, but where quantitation accuracy is unknown.

The MRL as defined by Analytica is the lowest demonstrated point of known quantitation accuracy.

The MRL should not be confused with the MCL, which is the EPA-defined "maximum contaminant level" allowed for certain regulated targets under specific regulations, such as the National Primary Drinking Water Regulations. Normally, the MRL is set at a level which is much lower than the MCL in order to ensure that levels are well below those limits. Not all target analytes have MCL levels established.

Other Flags may be applied. See Case Narrative for Description

Detailed Analytical Report

Analytica Alaska Inc.

Workorder (SDG): A0809003

Project: Lake Sampling

Client: Michael Baker Jr Inc

Client Project Number: Lake Sampling

REPORTING CONVENTIONS FOR THIS REPORT

A0809003

<u>TestPkgName</u>	<u>Basis</u>	<u># Sig Figs</u>	<u>Reporting Limit</u>
6010B/3010A (Aqueous) - RCRA	As Received	2	Report to PQL
7470A/7470A (Aqueous) - Total Hg	As Received	2	Report to PQL
AK102/3510C (Aqueous) - DRO	As Received	2	Report to PQL
AK103/3510C (Aqueous) - RRO	As Received	2	Report to PQL



ANALYTICA
group

Analytica Chain of Custody Form

12189 Pennsylvania St
Thornton, CO 80241
(303) 469-8868
(303) 469-5254 fax

4307 Arctic Boulevard
Anchorage, AK 99503
(907) 258-2155
(907) 258-6634 fax

475 Hall St.
Fairbanks, AK 99701
(907) 456-3116
(907) 458-3125 Fax

5438 Shauna Drive
Juneau, AK 99801
(907) 780-6688
(907) 780-6670 fax

Chain of Custody No: **65832**

Client Name & Address:

MILNER BAKERZ JR., INC
1400 W BERING BLVD #210
ANCHORAGE AK 99503
273-1600

Public Water System (PWS) ID#:

Section To Be Completed by Analytica

Report to: OZZY ORWICK

Turnaround Time for Results (TAT)

Invoice to Name & Address:

Phone No: 273-1607

Standard Expedited (< 10 days, prior authorization required)
(please specify due date below; add'l charges may apply)

Quote ID: _____
Account #: _____
Cash _____
Credit Card _____

Fax No: 273-1699

E-mail: orowick@mbakerz.com

P.O. or Contract No: 114916

Special Instructions/Comments:

Please ~~special~~ list all metals wanted!

Kit Prep/Shipping Charge: \$

Client Sample Identification / Location

Client Sample Identification / Location	Date Sampled	Time Sampled	Matrix (S-DW-WW-Other)	No. of Containers
LAKE 49323	8/27	1600		1
LAKE 49324	8/27	1700		1
LAKE 493 M9313	8/27	1145		1

Requested Analysis/Method	Lot # Pres:	Lot # Pres:	Lot # Pres:	Lot # Pres:	Field Preserved	Field Filtered	MS/MSD ?
DRO/REO	✓						
6010	✓						

Relinquished by:	Date	Time	Received by:	Date	Time
<i>[Signature]</i>	8/29/08	9:45	<i>[Signature]</i>	8/28/08	9:45
Relinquished by:	Date	Time	Received by:	Date	Time
DW	9/2	12pm			

Relinquished by:	Date	Time	Received by:	Date	Time
<i>[Signature]</i>	8/29/08	9:45	<i>[Signature]</i>	8/28/08	9:45

Relinquished by:	Date	Time	Received by:	Date	Time
<i>[Signature]</i>	8/29/08	9:45	<i>[Signature]</i>	8/28/08	9:45

Condition of Custody Seal?:	Temp/Loc:	Thermo ID#:	Shipped Via:
THO			
ANC			
JNU			
FBKS			

Name of Sampler: (printed)

